

T H E  
SECOND PART OF THE PRINCIPLES,  
O F T H E  
ART MILITARIE,

*Prattized*  
In the Warres of the United Provinces.

Consisting of the Severall Formes of Battell, represented  
by the Illustrious MAURICE PRINCE OF  
ORANGE, of famous Memorie.

*And his highnesse Fredrick Henry Prince of Orange that now is, Lord  
Generall of the Army of the high & mighty Lords the States  
Generall, of the United Netherlands, &c.*

Together with  
The order & forme of Quartering, encamping, and  
Approching in a warre offensive & defensive.

Composed by HENRY HEXHAM Quarter-master to the Regi-  
ment of the Honorable Colonel GORING.



PRINTED AT DELF,

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THE  
SECOND PART OF THE PRINCIPLES

MILITARY

By the Hon. Sir William Pitt, Bart. &c.  
Printed by A. MILLAR, in Pall-mall.

1756.

The Order of the Garter, &c.

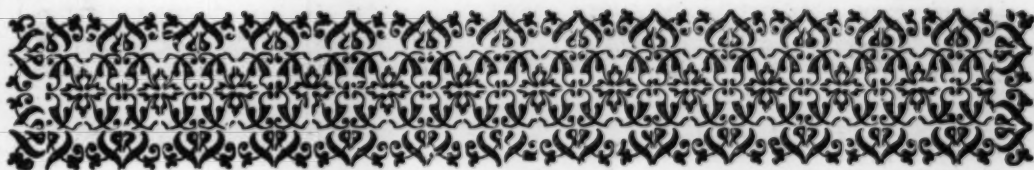
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1756.





To the truly honorable, *Mr George Goring*, Son & Heire to the *Lord Goring*, Colonell of an English Regiment, in the service of the Lordes the States Generall, of the United Provinces, &c.

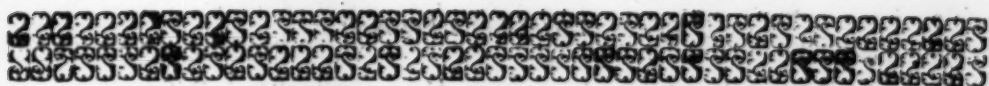
*Right worthy Colonell,*

**A**Ccording to my promise and weake abilitie, I have composed and finished this second part of the principles of the *Art militarie*, for so much as concernes the offices of the officers of the Feild, belonging to an Armie, and the diverse orders, and formes of Embattailling of Horse and Foote, represented at severall times and in sundry places by the two famous Generals of our age, *Maurice Prince of Orange* of happie memoire, and *Fredrick Henry* his highnesse the *Prince of Orange* that now is our *Generall*. Together with the order of quartering, encamping & approaching in a warre offensive & defensive. This I have done having gathered it out of diverse good Authours, for the instruction of such as are desirous to follow the profession of a Soldier, and it comes in most humble wise, to crave your gracious patronage, as one to whome I acknowledg my self much bound unto for your manifold favours, which if it be acceptable unto yow: it shal not onely give mee encouragement to fall on upon a third part: but also to pray unto the Almighty, for the recouerie of your health, and strength with much encrease of honour. Resting.

*Your honours servant, & Quarter-master  
ever to command.*

Henry Hexham.





## THE SEVERALL DVTIES OF THE OFFICERS OF THE FIELD BELONGING TO AN ARMY.

*And first of the Provost Marshall of an Army.*

**B**Ecause in the nature of his office, he is to execute all directions, and Commandements, that he shall receive from the Lord Generall, or Marshall, he shall be enjoyned to give, his attendance vpon the Lord Marshall. It is his office to publish all Proclamations, orders and decrees of the Generals, and all things else that are to be notified to the Troupes, as the Lord Marshall shall command him. He shall see them published in the Generals quarter, and before the head of every Regiment, being attended on by the Provosts of every Regiment. He shall have the keeping of the prisoners in the armie, that is to say, He shall by himselfe, and his men keepe the chiefe prisoners, and shall direct the Provosts of every Regiment, how the Prisoners in their charge shall be kept.

He shall have thus far forth Command over all the Provosts in the Armie, as they shall give an account to him of all the Prisoners they have, of the quality of their offences, and of the Information against them, yea as often as he shall direct and shall give vp an note, as well of his owne prisoners, as of the rest, once every weeke to the Lord Marshall.

He shall attend every Court day at the Generals, or the Lord Marshals, if it be held there and shall bring his Prisoners that are called for safely to the Court, with such Informations and witnesses, as are to be brought in against them: and shall after they have been heard, and proceeded withall, bring them back in safety, and so keepe them, till he have attended and knowne the further will of the Generall, or in his absence of the Lord Marshall. Also he shall be bound to have his Executioner, A place of execution, and all things belonging vnto it, whensoever, or wheresoever he shall be commanded by the Generall or Marshall, and he shall see the said executions so commanded duely performed.

The Provost Marshall shall have thus farre Commandement, ouer the Victuallers of the Armie, that he shall assigne their quarter in every Regiment, and shall appoint what victuals are to attend every Regiment. Also he shall give order to the Provosts of every Regiment, that they see no victuals sold, but at convenient houers, and that the prices of victuals and beere be reasonable, & every kan of beere sold at that price, as he hath marked it vpon the Barrells head, and as is appointed him.

It is further incident to his Office, to have account brought vnto him of all preyes of Cattell, and other victuals that are brought into the Armie, and that the same prey, as soone as it comes into the quarter, shall be shewed to him, and by him to the Generall, or Commisarie Generall of the Victuals, because it may be knowne, both whether the preyes be lawfull, & how they ought to be diuided.

He shall by the Provosts of every Regiment and his servants, cause all entrails of Beasts, that are killed in or neere the quarter, and all other Garbage and filth to be buried, and that in all things else the quarter be kept sweet, and the places adioyning cleane, and that the places of Easement prickt out in such a convenient distance, as he shall in discretion set downe, and that he himselfe as often as he can conveniently, shall visite the whole quarter, and shall cause the Provosts of Regiments, and his owne men to visite the severall parts of the quarter every day.

He shall have all fees, as well in preys that are taken, as in his service of the oversight of Victuals and Beere, and of all things els, which doe properly, and usually belong to the Provost Marshall of an Army.



*Of the Marshall of a Regiment.*

**T**He Marshall of a Regiment, is to receiue and keepe safely all such Prisoners, as are committed to his charge by the chieffes, Captaines & Officers of the Regiment, and shal bring his Prisoners to the Marshal Generall, or to a Court of Warre, whensoever they shalbe called for, or brought to Iustice,

It is also the charge of the Provost Marshal of a Regiment, to take speciall care, that all Women, Lackies Servants, Bread, & Brand-wine-men, belonging to the Regiment shall march after their owne Regiment, and not before, or vpon the flannes thereof.

It is his duty also, to set such Prizes vpon Beere, and Victuals, as the Lord Marshall or the Sariant Majour Generall have appointed, which order he receiveth from the Provost Marshall of the armie, sees it duely executed within the circuit of the Regiment, that the Sutlers may not sell their Beere or Victuals above the set rates, to grate vpon the souldiers. After the Captaine of the Watch hath gone the first Round, he is to see also that the Sutlers keepe no drinking and disorder in the night, but to put out their Candle-light and fires.

And during the time of divine service, he is to goe the Round, and to see there bee no tipling, or disorders committed in the Regiment.

*The Office of a Quarter-master  
Generall.*

**F**irst he is to be at all remoues, and before the taking vp of any Quarter, is to attend the Generall, or the Marshall of the Feild to receiue his direction, where and in what place the Armie is to be quartered, and how the Avantgard, the Battle, and the Reergard shal be distinguished.

Having received then his directions, and the Armie drawing neere vnto the place designed, he, & the Quartermasters of everie Regiment, rides before with a Guard of Horse & some firelocks to view and make choise of the Ground where the Armie is to be quartered, & there ordaines a Quarter for the Generall, the cheife Officers of the Feild, and their traines, together with the Regiments of everie *Tercia*, and giues out the ground, or lodgings to the Quarter-master of each Brigade, and they to the perticular Quarter-masters of everie Regiment, who drawes out the Quarters in that order and forme, as the Generall hath prescribed and as the figure thereof following shall demonstrate.

It is also his office to direct the Quartermaster of every Regiment, that they observe, in laying out their quarters, the same forme as the General hath commanded, that is, proportion for proportion, and to see that all places of Armes, streetes, fallies, and all things else be answerable, which being done, he visites every quarter to see whether it be made and done accordingly.

*The Office of a Quarter-master of  
a Regiment.*

**T**He Quartermaster of a Regiment in all changes, is to attend the Quartermaster Generall, to receive his directions, and takes the place and ground appointed by him for the quartering and lodging of the Regiment, and then drawes out his quarter for his Collonel & the other Officers of the feild, & every Captaine of each Regiment, according to the order of their march, & their seignories in the Regiment, distributing and giving to a Sariant of every Companie of the Regiment, who are to assist and attend him, the depth, bredth, and length of the quarter, with the distances of the Alarme place betweene the head of the Quarter and the Trench: and the true distance between the devision of Regiment and Regiment, as also when the Regiment is to be Quartered in Villages, and Houses, he is also to obserue that forme, and directions, which the Quartermaster Generall shall giue him.



*The Office of a Trench-master.*

**B**ecaufe as Quartermaster he shal know the ground that is layd out, so he is to execute the Office of the Trench-master in the outworkes of the quarter, as he doth of Quartermaster within, these two Offices having affinity the one with the other; and therefore must sett out distances betweene the quarter, the Trench, or Rampier, with the breadth and depth of the Ditch, be the quarter altogether entrenched, or in part, as he shall receiue direction from the Generall, or Marshall, and also the proportion of all Outworkes, Flanks, Mounts, Batteries, and other workes that shalbe appointed.

As it is showne, what is the dutie of a Trench-master in encamping: so in marching he is tyed to this, that he doth direct the making of wayes, or *Explanadoes* for the passing of the troupes, or marching of the Ordinance or Carriages, according as he shall receive direction from the Generall, or Marshall, Provided that in making way for the Artillerie, he take the Quarter master a long with him, assigned by the Master of the Ordinance for that purpose, and for the Carriages, and that the Carriage Master be also there with him.

In all Approaches he is to take charge of the Trenches, and other workes, for which after he hath received direction from the Generall, or the Marshall, he shall give directions to all those that doe worke, and see that the workes be carryed in such sort, as they are appointed. In which service all that doe worke, whether they be *Pinioners*, or Souldiers commaunded must obey him.

*Of An Inginier.*

**A**N Inginier ought to be a man skilfull and experienced in Arithmatick, Geometrie, and the Mathematicks, and before he begins to breake ground, or runs his lines of Approches, he ought to consider well the Situation of the place, and to have regard to the Proprietic, and nature of the place, whether it be high ground, low, Plaine, or hillie.

By day he viewes well the ground, that he may the better run his Approches by night, in setting out his sticks and markes, that he may Place his men to gett into the ground with the more Safety, to make the Corpes de gard, and Batteries vpon the most advantageous places, for if he should mistake his ground, and not run his Approch well, by turning and winding it, and Carrying it from the Bulwarkes flanks, and the outworkes of a Towne, or Fort: he may endanger the lives of many men, and therefore it behoues him to be very Carefull and Circumspect, but of this wee shall speake more at large, when wee come to handle Approches.

*The Office of the Commisarie Generall of the Victuals.*

**H**E is to take charge of all the Victuals prepared for the Armie, as well by Sea, as Land-service, and to see himselfe or by his Ministers the proportion of Victuals to be duly distributed to the Souldiers and Mariners, as the Generall, or Admirall shall direct.

All Purfers, Stewards, and all other that shall in any shipp hane charge and oversight in Victuals (as also all vnder Commisles, and Conductors of Victuals by Land) shall vpon the discoverie of the extraordinarie wasting, spoyling, or miscarrying of Victuals presently giue notice to the said General (or Commislarie Generall) of the Victuals, that he may presently take order in it.

Wheresoever the Armie shall land, March, or lodge, all the Victuals found in such places shal be seized vpon by him, and a proportion set out by him for the present vse of the Troupes there quartered, and the rest reserved as part of the Generall store, and Magazine

of Victuals, and to that end he shall goe himselfe, or send his Officers, or Clarke to attend on the Lord Marshall, when he or the Quartermaster Generall goe first to view, and take vp the Quarter.

He shall keepe a List of all the Bakers, Millers, Butchers in the Armie, and of all others that are to be used in the Provision of Victuals, to the end, he may set them a worke as occasion and the service shall require.

All Instruments for grinding, Ovens, Baking, or for preparing, bestowing, Carrying, or for the preserving of Victuals shalbe vnder his Charge, and he shall have authority to vie and dispose of them for the publick service.

If any prizes of Victuals shalbe taken at sea, the Commissary Generall of the Victuals shall both take a note or Inventarie of it, and appoint some Officer of his to take charge of it.

If any preyes be taken by land, he shall likewise have a note or Inventarie of all, and view it himselfe, he shall make the division, as he shal be directed by the Generall, or in his absence by the Lord Marshall

He shall give out noe extraordinarie Victuals, but by order and warrant from the Generall, and shall give from time to time an Account vnto him of any wast, spoyling, or mis-carrying of Victuals, that shalbe in the Armie by Sea, or by Land.

*The Carriage Master his Office.*

**H**E is with as much authority, to marshall, and order all the Carriages of the Armie, as the Sarjant Majour Generall is to marshall the Troupes.

He shall see the Carriages of the Munitions first to be placed in the best, and safest places, next the Carriages of the General, and chiefe Officers of the Armie, the next by their turnes: but because the Incumbrances of carriages, may oftentimes disorder the whole troupes, he shall receive his directions from the Sarjant Majour Generall of the Armie, where his charge shall march, though the particular disposing, and ordering of the carriages be left to himselfe.

Hee shall haue three severall men, or Officers of his called Conductors, to attend vpon the severall divisions of Carriages, as sometimes vpon the Baggage of the vanguard, the Battell, and the Reereguard. Sometimes vpon the Carriages of munition, and Ordinance, the Generalls and chiefe Officers carriages, so that in the order of marching they shall be divided into three bodies, and he shall have some Smithes, Carpenters, and wheele-wrights attending vpon every severall division. His best order in marshalling the Carriages, will be to observe the same course, that the Seriant Maiour doth in marshalling the Regiment, the which by the Provost of every Regiment, he may give notice to all them that goe along with the Carriages.

His direction being given, he shall oversee the whole order of march for all the Carriages, and shall make the Provosts of the Regiments keepe the same order.

*The Muster masters Office.*

**H**E shall having order take a Generall-muster of the whole Armie before it be embarked or march, and keepe a perfect List of the number of Armes, a Coppie of which List he shall deliver over to the Generall, that he may know the strength of the Army.

Hee shall make reviewes as often as the Generall, or in his absence the Lord Marshall shall appoint, and shall alter his List as he finds altered in strength, and shall keepe Notes of the alteration, betwixt every muster, and of the causes of the diminishing of the strength of the Troupes, That is to say, what men are flaine vpon service, and what are dead of sicknes, and what men are run away, or discharged by passport.

He shalbe respected, and obeyed in the execution of his Office, and no Colonell, nor Captaine



Captaine, shal refuse to shew him their men, whensoever he shall require them from the Prince or Generall.

*Of the three Chiefe Officers of a Regiment.*

*First of the Sariant Maiour of a Regiment.*

**A** *Sariant Maiour* ought to be a Valiant man, an old Souldier, and one that is well experienced in the way of his profession, vpon all occasion his place gives him accessse to the Generall, the Marshall of the feild and the *Sariant Maiour* Generall of the Armie, to know when, how, and in what manner his Coronels Regiment is to march, whether in one bodie alone, or else in two diuisions ioyned with others.

Wherevpon he gives order how the Regiment is to be marshalled, and ordered, in what forme the Companies are to draw, and when vpon any service they are disbandied, how to really them againe as is required of him.

He receives his orders and Commands, either immediatly from the Generall himself, or from the Marshall or *Sariant Maiour* Generall as is said, whether the Regiment be to march in the *Vanguard*, the *Battel*, or the *Reereguard*, and ought to have some knowledge how the Countrie lies through which the Armie is to march, whether over a Spacious *Campanie* in Battaille, or through narrow passages, over rivers, woods and the like, by drawing out of files, as the ground and passage will afford, as also what forme the Regiment is to hold, if they should be charged with horse, have ordinance playing vpon them, or troubled with much baggage.

He shall in the presence of his *Coronel*, or Lieutenant *Coronel* be an assistant to them, in seing all orders and directions executed and performed, and in the absence of them both, to have the same authority, and Commaund, that the *Coronel* himself shall have.

In marching or Imbattailing, he shall keepe as neere the midst of the Regiment as he can either in the front, the Reere, or the flanks, and so he may best overlooke, and observe the order of their March or imbattailing.

The Regiment being drawne vp in diuisions, he gives to every Captaine, and Officer his place, according to his seigniority, and withall commaunds the *Drummaieur* and the other Drummes to beate a march, and to move all at an instant, and see that the souldiers keepe well their rankes and files, and none disbandie themselves, or straggle.

He shall come every morning, and evening to the *Sariant Maiour* Generall of the Armie, or to the *Sariant Maiour* of the *Brigade* or *Tercia*, to receive the *Word* and orders from him, if there bee no extraordinarie cause to hinder him: and when he hath received the *Word* from the *Sariant Maiour* Generall, or from the *Sariant Maiour* of the *Tercia* his Coronell and Lieutenant Coronell being present in the Quarter he gives them first the *Word* and orders, and afterward delivers it over to the *Sariant maiour* of that Regiment, drawne in a ring according to their Captaines *Seignoritie*, which are to come and attend vpon him for the same.

As he doth receive directions for marching, imbattailing, viewing of ground, and placing of guards from the *Sariant Maiour* General or the *Sariant Maiour* of the *Tercia*: so he is to deliver them over to the Captaines, and Officers of that Regiment, and to call vpon those to whom it doth appertaine, to see them duely executed.

Everie night he is to visite all the *Guards* of the Regiment, and to keepe the turnes of the watches, and marches (that one Captaine may not doe more duty then an other) as also in sending out troupes vpon service, to the end, both the labour, and the honour may be equally devided.

It is also his dutie to speake for Amunition, as powder, Bullets, Match, and victuals for the Regiment, if there be any want, and to see them equally distributed to the Companies, according to the proportion given out, and finally to give order and proportion for the number of Commanded men, of the Regiment that are to goe to worke.

## Of a Lieutenant Coronell.

**T**He next place above a *Seriant Major*, is a *Lieutenant Coronell*, which is an honorable charge, when his *Coronell* is present, he is to assist and obey him, in seeing all the Commands and directions, that are delivered by any publick Officer, or such as shall be within the authoritie of a *Coronell* himself, to be duely executed in the absence of his *Coronell* he hath as absolute command, and authoritie over the Regiment, as the *Coronell* hath himself.

In marching or embattailing, if the Regiment consists but of one division, whensoever the *Coronell* is in the head of his Regiment, he is to bring up the *Rear* of that Regiment, but if there be two divisions, then the *Coronell* leads the first, and the *Lieutenant Coronell* the second, but when his *Coronell* shall be in the *Rear*, marching from an *Ennemie*, then it is his place to be in the head.

If the Regiment consists of two *Battailions*, his division is to quarter and lodge on the left hand of his *Coronell*; and himself in the *Rear* of his owne *Compagnie*.

## Of a Coronell.

**A***Coronell* hath a very honorable Command, and is called in Spanish and French *Maestro del Campo*, or in French *Maître de Camp*, that is one of the masters of the Field, and therefore ought to be a man of Authoritie, and respect, having absolute Command over the Captaines and Officers of his Regiment, and all such are to respect his Commands, and obey him, as fully as they would doe the chiefe Commanders, & ought to love and honour him, which his valour, wisdom, and direction will acquire him.

Also he shall see that all orders, Commandements and directions, which are delivered him by the publick Officers of the Armie for guards, marches, quartering, or any thing else, for matter of Justice, or for ordering of the troupes and furtherance of the service, be duely executed, and performed within his owne Troupes. Further, if he himself doe finde any mutinie, or any discontented humours tending to mutinie, extreme outrage, or disorder, or shall by any of his *Captaines*, Officers, or Soldiers be informed of any such thing, he shall forthwith advertise the *Generall*, or Lord Marshall of the Field. And if he finde any other fault, negligence, or swerving from either the directions, or the policie of the Armie set downe, he shall straightwaies acquaint them by whom such direction did, or was to come vnto him, or some other superiour Officer, if he cannot conveniently acquaint him with it, and shall produce the party so offending, with the witnesses and proofs that order may be given forthwith, and justice done. And if he faile to give this information of any thing he knowes, or heares of, he shall be thought deeply faultie, or if any such things passe without his knowledge, he shall be thought of worse government then befits a man of his place and charge.

Vpon marches the *Coronell* shall be at the end of his troupes, that is, nearest the *Ennemie* in the head of his Regiment going towards an *Ennemie*, and in the *Rear* comming from one, and he shall not goe from thence, except it be for the ordering of his troupes, or some extraordinary occasion to attend the *Generall* or the chiefe Officers of the Field. Also he is to see and command that his Regiment be well armed and exercised.

A *Coronell* being one of the chiefe Officers of the Field, ought to be called to take Councill and advice with the *Generall*, especially, vpon any peece of service or in the day of Battle, which concernes his charge, where he may freely with others speake his opinion of matters of weight, and importance. And though his opinion may be good, yet if the most voices be of the Contrarie opinion, and that things in the execution thereof should fall out ill, howsoever, he ought to give way and subscribe vnto the plurality of voices, and wholly



wholly obeying his *Generall*, be ready to execute all his Commaunds, giving thereby to vnderstand, that the contrarie opinion, which he held in the Council of warre, was neither for want of Courage nor affection.

A *Coronell* ought also to give all respect love and obedience to the *Generall* of the Armie, the *Lord Marshall* and the *Sarient Maiour Generall* of the Feild, as having charge from the *Generall* to give out orders, to quarter and appoint allarme places, the place of Battaille, for marching, choosing of guards, and sending out convoies. Also once every weeke the *Coronell* may call together all his Captaines and shall enquire of all Offences hapned in his Regiment, and examine duely the nature and quality of such Offences, and to prepare the causes for a more short and easie hearing in a Marshalls Court, for all *Coronels* are to repaire to a Court of warre as often as they shall be warned, as an assistant to the *Lord Marshall* or president of the Council of warre in all causes, that shalbe questioned there, belonging to the iustice of the Armie.

Finally, in quartering or lodging, if his Regiment consists of two divisions, he shall quarter in the division that is betweene his two battaillions assigned for his Regiment, because so hee may best give directions to the whole, but wee shall shew this more particularly, when wee come to draw out the Quarter for a *Coronell* of his Regiment.

*Of the Sarient Maiour Generall  
of an Armie.*

**T**He Office of the *Sarient Maiour* of an Armie, is a place of a high degree, whose Commaund, is full of action, and therefore ought to be an able, a wise, a grave, and a valiant personage, experienced in the way of his profession.

He is to come to the *Lord Generall* or *Lord Marshall* for directions for all watches, and guards, that are to be placed: and vpon the change of a Quarter, or a remove, he is to march with the *Generall*, or the *Lord Marshall* in the *Vanguard* (after he hath scene the Troupes settled in the order of their march) and to view the places appointed him by the *Generall*, or *Marshall* for the placing of the guards vpon the very first arrivall of the Troupes.

Having received the *Word*, and his Orders from the *Lord Generall* or the *Marshall*, he delivers it to the three *Sarient Maiours* of the *Tercias*, called also the three *Corporals* of the *Feild*, and they give both the *Word*, and orders to the *Sarient Maiours* of every Regiment.

Hee himselfe in the beginning of the night, after the warning peece is gone of, and that all *Guards* are settled, he is to visite them, and gives order to the three *Sarient Maiours*, or grand *Corporals* of the *Feild*, that attends vpon the *Vanguard*, *Battle*, and *Reereguard*, at what time they (or some chiefe Officers of the *Feild*) shall goe the *Ground Round*; and if he, or they finde any thing amisse, or any thing extraordinary discovered, either when he goeth himselfe, the other three *Sarient Maiours* of the *Tercias*, or any other chiefe Officer, they are to giue an account to him, and he to advise the *Lord Generall* or *Marshall* with it.

In a day of *Battell*, or any kind of fight, he is to come to the *Lo. Generall* or the *Marshall* for directions, and to see those directions executed.

In a day of *Battell* also, he hath the ordering, and disposing of the divisions and *Battalions*, according to that forme, which the *Generall* Commaunds, and vpon all occasions is active and stirring vp and downe, to spie out all advantages, which may offend an *Enemie*, and wisely to foresee all disadvantages, which might annoy, or bring the Troupes into any disorder.

Also he is the first chiefe Officer, which is to be at the *Rendezvous* for the receiving, and disposing of the troupes of horse and foote, as also in giving order to provide them with Ammunition and Victuals.

And being arrived first at the *Rendezvous*, he is to give the *Lord Generall* and the *Lord Marshall*, to vnderstand the state of the Armie, that the *Lord Generall*, may therevpon give him commaund, and direction, how, and in what manner, the Army is to be ordered,

and afterward gives order to the *Sariant Maiours* of the *Tercias*, and they to the *Sariant Maiours* of the *Regiments*, for the providing of *Ammunition*, *Victuals*, and all things necessarie for the ordering of the march.

He ought to be well acquainted with those passages, and wayes through which the *Armie* is to March, and Commonly Marches in the head of the *Vanguard*, hauing some light horse and firelocks to attend him, and to send out some troupes, to discover the waies, and passages, for the preventing of *Ambushments*, hatting the *Captaines* of the *Pionniers* to wayte vpon him and the *Quartermaster Generall*, for the making and explayning of waies for the *Armie*, that they may not be surprized on a suddaine. And drawing neere vnto the Place of Quartering, or encamping, he, and the *Quartermaster Generall*, riding before do view, & choose out such ground and villages, as may be most commodious for the lodging, and Quartering of the *Armie*.

To Conclude, he is to haue absolute Commaund ouer the three *Sariant maiours*, or *Corporals* of the feild, who are to be his *assistants* and his mouth, as he is the mouth of the Lord *Generall* or *Marshall* and therefore hath a vigilant eye ouer all things, and sees that the *Generals* Commaunds deliuered to him, be strictly kept, and obserued.

*The Office of the three Sariant Maiours of a  
Brigade, or Tercia, otherwise called  
Three Corporals of the feild.*

**T**He States *Armie* by order from his hignesse, the *Prince of Orange* is Commonly vpon a march diuided into three *Brigades*, or *Tercias*. Ouer each *Tercia* there is a *Sariant Maiour* of the feild, and in our *Armie* three, namely *Sir Iacob Ashly* Lieutenant Coronell ouer the *English*, *Monsieur Buat* Lieutenant Coronell ouer the *French*, and *Sir David Balford* Coronell ouer the *Scotch*. In *French* he is called *Le Marechal*, or *Le Sariant Maiour de Bataille*, and in *English* one of the *Great Corporals of the Feild*. A *Sariant Maiour* then of a *Tercia* doth receiue his order, either from the Lord General himself, or the Lord Marshall, but most commonly from the *Sariant Maiour Gen.* aboue mentioned. In what forme the *Tercia* is to be ordered, and march, with what *Regiments* of foot, horse, Ordinance and Baggage. Hee assigns and shewes them the Place, where they are to draw out in *Bataille*, and from the *Sariant maiour Generall*, whether they are to march in the *Vanguard*, the *Battell*, or the *Reereguard*, so that in marching euery one of these three shall attend vpon his *Brigade*, and seuerall diuisions, and in the absence of the *Sariant Maiour Generall*, see that the order of Marching, or *Imbattailing* be duely obserued. And so euery one of these three *Sariant Maiours* of the feild so assigned, shall be at the Commandment of him that Commaunds that *Brigade*, or *Tercia*, to be sent to the Lord *Generall*, *Marshall*, or *Sariant Maiour Generall*, vpon any occasion that belongs to the service.

These three *Sariant Maiours* of *Tercias*, are to be lodged as neere the *Sariant Maiour Generall*, as conueniently may bee. And these three which attends vpon the *Vanguard*, the *Battell*, and the *Reereguard*, shall with the *Sariant maiour Generall* make choise of ground for the placing of the guards, which they assigne vnto the *Sariant Maiours* of the *Regiments*, and shall goe the Round, and visite the guards commonly euery night, and at such an houre, as the *Sariant Maiour Generall* appoints them, and as often, either by night, or by day as he shall direct them.

If any of these three *Sariant Maiours* of the Feild shall finde any want of powder, munition, or *Victuals* in the *Vanguard*, *Battell*, or *Reereguard*, either in march, when the troupes are lodged, or quartered, or during any fight: He doth aduertize the *Sariant Maiour Generall* of the *Armie*, with the said wants, and then by his direction, shall goe with an Officer of euery *Regiment* of that *Tercia*, to the Master of the Ordinance, the Lieutenant of the Ordinance, or to the *Commisarie Generall* of the Munition or victuals.

To conclude, he receiuing the *Word* and orders from the Lord General or *Sariant Maiour Generall* of the *Army*, giues it to the *Sariant Maiours* of the *Regiments*, but because sometimes, when the *Word* is to be sent to all the Quarters, the *Sariant Maiour* of euery



*Traffised in the Warres of the Vnited Netherlands.*

every Regiment cannot conveniently come to the *Sariant Maiour General* of the Army for it. The *Sariant Maiours* of the *Tercias* do attend vpon the *Sariant Maiour* of the Armie every morning, and euening to, receiue orders, and to carry the Word vnto the severall Quarters, where the *Sariant Maiours* of euerie Regiments comes vnto him for it.

*Of the Master ( or Generall )  
of the Ordinance.*

**H**He hath the charge of all the Artillerie, Armes, Munitions, Engines, Matterials and Instruments for worke, yea of al things that belongs to the Ordinance, as Bedds, Carriages, and all things that appertaines to the Office of Master of the Ordinance.

Under the Generall of the Armie, he hath absolute Commaund, over all Officers belonging to the traine of Ordinance, as the Lieutenant of the Ordinance, the Controuler, the Clarke, the Gentlemen of the Ordinance, the master Gunners, Armores, munitions, Inginiars, Captaines, of Pyoniers, and Mineurs, ouer all Smithes, Carpenters, and Wheelewrights, And ouer all Artificers, and Attendants vpon the traine of the Artillerie, Munitions and Matterials.

The Master, or Generall of the Ordinance ( after the places for Batteries are chosē, & assigned him by the Generall of the Armie, ) he is to obserue, Command, and direct the making of Gabions, Bedds, and platformes for the Ordinance, and to giue direction for the making of waies and Explanadoes, for the bringing of the Ordinance vp to the batteries, to see that the Batteries be made Canon prooffe, and the portholes so, that the Ordinance may most annoy an Ennemy.

And after he is once commanded by the Generall to begin a battery, he is to giue directiō to his inferiour officers, to play and beate with the Ordinance vpon such and such places, till the Generall giues order to the contrarie, and as occasion and ground is gained to advance and remove the ordinance to neerer places. Also in a day of battell or fight, he is to choofe the most advantageous places, for the planting of Ordinance, where they may gaule and offend an Enemie most, having a Vigilant eye that all things be done in good order.

All the Ordinance and Carriages belonging to the traine of his Office, are vpon a march, in the safest place, and are to take place before all the other Carriages of the Army, unlesse some of the Ordinance be drawne to march in the *Vanguard, Battell, or Reere*, or to some other places, where the necessity of seruice may require.

He is to make orders and Lawes for the well-governing of his Inferiour Officers and all Artisans appertayning to his Office, with which he is to make the Generall acquainted, that he from time to time, may know the State of the Ordinance and all things belonging thereunto, and take care that the seruice of the Land be in no wise defrauded.

The rest of the Officers vnder his command, and the dependances thereof shal be handled more particularly in a treatise apart.

*Of the Commis of the Ammunition and  
Matterials.*

**T**He *Commis of the Munition and Matterials*, is vnder the traine of the *Master of the Ordinance*, he by order from the *Generall, or the Sariant Maiour General*, gives out al Munition, as *Powder, Bullets, and Match*, to the Regiments, and Companies, according to the proportion Commanded by the Generall: and as he receiues his List and Billete from the *Sariant Maiour General* of the Army, for which orders being giuen out, the *Sariants* of euery Companie repaires to his Lodging, or quarter, to receiue it and giues an acquittance vnder their hand for the receipt of it. Likewise what powder, *Bullets or Match* are spent and shott away in the Approaches or Trenches, The Colonell which Commands there, giues him his hand, how much powder, how many firkins of Bullets, and how much match was spent and shott away that night, and the day following, because he is to giue vp an account

account vnto the States, and Generall how it was bestowed.

Moreover, for entrenching, outworkes, and Approches, he is to deliuer to the Quartermaster of euery Regiment, as many Materials: to witt, spades, showels, Axes, pickaxes, hachers and bills, as there are workemen Commaunded out of euery Regiment, and Company, to go to worke, which materials the Quartermaster is to passe his hand for, and to distribute them to the Companies, and when the worke is ended, to deliver them vp againe, or to giue him a Reckoning, how many are broken, or lost vpon service, that the Commis may render vp an account of them to the States.

*Of the Lord Marshall of the Feild.*

**T**he Lord Marshall of the Feild, is in Commaund, and authority next vnto the Generall, and is (as it were) his Lieutenant, and Mouth, and therefore being in so eminent a place, ought to be acquainted with the duties of the other Officers of the Feild, especially, with the Generals Office it self, because there is such an affinity betwixt them, as hauing absolute power to commaund the Armie in the Generals absence, and oftentimes he may be employed to Commaund an Armie himself, as Commonly the Lord Marshals of France doe.

His chiefe Office is, to see that Iustice be duely administred, and that the lawes, Articles, and Ordinances of Marshall discipline, be stricktly kept and observed, that all banishments, and Proclamations coming either from the Generall, or Councill of warre be published and executed, and by his Authority to cause Malefactours, and offenders to be punished as an example to others. And seeing that all he doth, is for the Generall good of the whole Armie, he ought to be honored, and respected of all men and in no wise Contradicted: It is his proper charge, to take care, that the policy and discipline of the Armie, and the orders established by the Generall, be exactly kept and observed vnder his authority.

All quarrels, and Duels, hapning betweene Officer and Officer, between Souldier and Souldier, either, Horse or Foote, ought to come before him, being his Office to right the wronged, to punish the Offendour, and by his wisdom, and authority to appease and compose them.

The Lord Marshall when the *Vanguard* is drawne out, and ranged in Battaille, while the Battell, and the Reere are a dislodging, he sees that both Horse, and Foote march orderly and in their owne place.

And with some choise Troupes marches before the *Vanguard*, and Considers the waies and passages, as valleys, Rivers, Marras, Bogs, mountaines, hills, hedges, woods, hollow, and Narrow waies, through which the Armie is to passe, that he may order the march accordingly, as also to send out Scouts, Guides and Espies, to discover and get intelligence from an Enemy.

He also marches before the head of the Armie, sometimes with the *Sarient Maiour* Generall, the Quartermaster Generall, and the Quartermasters of every Regiment experienced men, to view and make choise of the ground, where the Armie is to be lodged and Quartered. He observes also the marching, Quartering, and order of fighting, three chiefe things belonging to an Armie, and sees and Commaunds, that the march, Quartering and fight be conformable to that order, which the Generall hath prescribed. And the Divisions and Troupes ranged in Battaille: he is full of action, and considers the place and soile of the ground, the advantages of the Sunne, and winde, and how the Troupes with most advantage may be brought to encounter an Enemy, taking care that the order commanded by the Generall be not changed, and in fight he sees that they be duely seconded, and relieved, and being overlayd or charged, to cause them to retreate orderly, for the auoiding of confusion, hauing a vigilant eye vpon all casualties, which may happen. For, what the Generall ordaines, the Lord Marshall sees performed and executed, to the end, that both their desires may take one effect. For when Commanders vnder takes a warre, and fight with Councill and



and Iudgement, and sees all things executed with wisdom, discretion, and valour, giving the successe to God, no man can be blamed.

The Lord Marshall also ought to be acquainted with the Generals desaigne, and whether hee is resolu'd to fight with an Enemy or no; to consider whether hee is to charge an Enemy in the Front, in the Rere, or on the Flanckes, to hinder them from Quarters, and to lend out Convoies for the cutting off of his Victuals and provisions.

He ought to consider likewise, how an Enemy lies encamped, which way he can come best to attempt him, which way he marches, and whether his desaigne tends, what order he keepes, with what Troupes he may hinder or annoy an Enemy, or being once engaged in fight, how he may best second, and relieue his owne men, either with Horse, or foote, to place and bring up the diuisions of Muskettiers, where they may most offend and gale an Enemy, and how the bodies of pikes may with the most advantage bee brought to the charge and shock.

As also to understand of what strength in horse and foote the Enemy is, what Baggage and Carriage and incumbrances he hath, and whence his Victuals are to come, to know whether an Enemy is to ioyne with an other, and how, and in what maner he may best break that Coniunction.

Hee is to haue by him also, an exact *Mapp* of that Countrey, and a discription of all the wales, and passages through which the Armie is to passe, having also good *Guides*, wel acquainted with the severall passages of that Countrey and place.

The Lord Marshall likewise, with the Sariant *Maiour Generall* of the Armie, appoints all places for *Watches* and *Guardes*, either of Horse, or Foot, which he assigns to the Sariant *Maiours* of the *Tercias*, and they to the Sariant *Maiours* of the *Regiments*, the places, which they are to maintaine, and make good. Also the *Alarme Places*, and makes choise of the ground to fight a Battell in, for the better safety and defence of the Armie.

In the day of Battell he is full of Action, continually in motion, stirring vp and downe to giue directions where need requires, to encourage the Souldiers, and Officers, and to find out all advantages, where they may most offend an Enemy.

Vpon a March, or being encamped, he ought to countenance, and favour Marchants, Victuallers and others, which furnishes, and brings provisions vnto the Armie, and giues Command, that they be not abused, and wronged, but may sell their provisions and Commodities peaceably. As also he giues order by his authority to the *Provoost Marshall Generall*, and to the *Marshals* of everie Regiment, to sett reasonable rates, and prices vpon Victuals and Beere for the good of the souldiers.

There are divers other points appertaining to the Office of the Lord Marshall, but for brevity sake, I will now Omitt them.

THE OFFICE OF THE LORD (OR  
*Captaine) Generall of an Armie.*

**A** *Generall* hath absolute Commaund ouer the whole Army, and is to know, and to vnderstand well, the charges and duties of euerie Inferiour Officer vnder his Commaund, and ought to be a personage of great experience, wisdom, and discretion, that he may be capable to discern, and chuse the best of different opinions, which often fals out in Councils of warre.

Yea, to be a personage descended of some noble house and familie, which will giue a lustre vnto his Commaund, a man of an vndaunted Courage & authoritie, seuer and austere in his Commaund, who ought to be greatly honored, feared, and respected, a man full of resolution, and magnanimity in the daie of Battell, and constant and resolute in desperate cases, happie in his designs and enterprises, and aboue all religious, invoking God to be propitious vnto him, and to giue a blessing vpon his designs, to giue him knowledge, policie and vnderstanding, how to order and Gouverne his Armie well, that he may keepe it vnder good discipline, and to make it not onely capable of vanquishing, but also Victorious, which depends onely vpon the Almighty power of the Lord of Hosts, and that neither good, nor bad successe should make him change, or alter his Countenance, but vpon the hottest services, to giue out his orders and directions with temperance and moderation without impatience, Choller, cruelty, or emulation, against those that vnder his Commaund, haue gained honour and deserued well, which, he ought rather to advance and reward them, and this will make him to be honored, loved, and respected of all men.

A *Generall* then ought to be qualified with these excellent vertues, namely, *wisdom, Valour, Experience, Providence, Constancie, Authority, and Liberalitie*, and should ponder, and Consider well, the occasion, which may engage him in a fight, or moue him to giue battell to an Enemy, to be sparing, and a good *Menagier*, of the liues of his men, and not rashly and unadvisedly to hazard his Troupes, for he may vanquish, as well by *Policie* (in foreseeing all advantages and disadvantages) as by *force*, by pulling on the *Foxes* skin, as well as the *Lions*, as by surprising an Enemy vnawares, by laying hold vpon an advantage, when their Troupes are in disorder, when they are disperfed, when they are dishartened, harried, and wearied out, when they are pinched with hunger, thirst, and cold, and such like casualties, and accidents which may befall them.

Moreouer, in seeking to diuert, amuze, and divide their Armie, while he keepes his owne in peace, concord, and vnity, which is one of the Principle points of warre. To gaine time, and advantagious places, and to prevent, and hinder an Enemy from possessing them, to seeke by all meanes to diuert, and breake an Enemies designe, and to put his owne into execution with expedition, and to premeditate and ouerweigh a thousand things, which depends vpon the warre, having a vigilant eye vpon all accidents that may happen, for the Art military hath many difficulties attending vpon it, and one is not able to expresse the many hazards, straights, and differences which may fall out in this profession.

Hee ought not lightly to hazard his men vpon skirmishes, or in a Battell, (vnlesse he be forced to it) but vpon very good grounds, and advantages, for having flesht his men in small occasions, it hartens and enbouldens his souldiers, and giues them the more encouragement: and assurance of good successe in greater for they perceiuing the valiant, wise, and able Carriage and Conduet of their Leaders, & Commandours, especially of their Generall, this makes them fight brauely, and gives them a hope of Victory.

A Generall also ought to take the graue sage Councill and wise advice, of his chieffes, and Commandours, and (as is sayd) to make choise of the best, and yet not to make knowne his owne resolution; for many a brave attempt and enterprize hath bin broken for want of *Secrecie*, and if he should reueale it to some intimate friends, yet to doe it very sparingly and referuedly, by which meanes of *secrecie*, he shall gaine knowledge, and experience, and in an instant will be ready to lay hold vpon such & such occasions, as may execute his Resolution,  
and

and thereby make him capable of preuailing.

A Generall ought to take care, that his Armie be not wearied out, and fatigated ouermuch, which breeds sicknesses, and causes the weakning thereof, to see & Command that the Regiments be well armed, and duely exercised, in all the seuerall motions of warre, that Iustice be readily executed, to be fauourable to good men, and seuer against euill doers and Offendours. It is also the Office of a Generall to giue Charge, that the Armie be provided with Victuals, amunitions, and other things belonging to the warre.

A Generall ought to speake diuers languages, for hauing to doe with sundrie Nations vnder his Command, being able to speake vnto them in their owne language, this giues great deale of Contentment.

Moreouer, he ought to be learned, a good *Mathematician*, and well scene in the points of *Fortification*, and to haue excellent Ingeniours about him, that are carefull in running the lines of Approches for the preservation of the liues of men.

It is requisite also, that he should haue good *Guides*, and spies about him, to get him intelligence of the State of an Enemy, and ought to spare no money that way, for the breaking of an Enemies designe, and the aduancement of his owne.

A braue Generall also considers, that the force of an Armie consists not in the multitude of men, but in Valliant and well experienced souldiers, and Officers, which are well instructed, and trained vp in the vse of their armes; and knowes that Victorie consists not in many Troupes but that an Enemy may be more stronger then his as oftentimes hath hapned but in obseruing of good order, and discipline choosing of aduantages of wind, Sunne, and ground, together with the ready obedience of his men, in executing of his Commaunds, for by experience in their profession, they become more bould and confident in fight, so that an old beaten souldier, knowes it by heart, what his Chiefe and Generall requires of him.

As a Generall should be beloued: so likewise he ought to be feared and of the two among Common souldiers rather to be feared; for the most part of them, are rather restrayned from doing euill, for feare of punishment, then for any loue they beare to their Generall.

To conclude, he ought to be experienced in the beleegring of Townes, and Forts, to view all places of aduantages, and where an Enemy may most offend him, to fortifie his Campe strongly with lines of *Circumualation*, Forts and workes vpon it, to know the site, and situation of a towne, how, and in what manner those within are able to defend it with men and munition, to cause his Ingeniours to be very circumspect, and Carefull how they run their lines. to sap forward to the weakest part of that Towne, or fort which he intends to become Master of, with diuers other things requisite in a brave Generall, which for breuities sake I will omit.

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THE



## NOW FOLLOVES IN WHAT ORDER

*an Army ought to march in over a Campaigne, narrow passages,  
Woods and Rivers.*

**H**AVING shovne the severall Offices of the Officers of the field, it refteth now to speak something in what order an Armie ought to march.

The Armie then being come to the *Rendezvous*, or being to disencampe from any place, the afternoone, or evening before the breakeing vp of it, orders is giuen out, that the Souldiers shal be provided with Munition, and so many dayes Viſuals, as the Generall shal Command.

But an Enemy being neere at hand, when the Generall will conceale the breakeing vp, they draw into Armes silently, without sounding of Drum, or Trumpet.

The Generall being attended vpon before his Lodging, by the Sariant *Maiour Generall*, the *Quartermaster Generall*, the *Captaine of the Pionniers* and some other Officers.

The most part of the Armie, being drawne into Armes, the Generall giues Command to the cheife *Ingenier Quartermaster* or some other, to throw downe the Trench, fill vp the Ditch, and to make such Tappes in it, that whole deuisions, and Battaillions may march through them.

After the Trench is cast downe, the *Generall*, or the *Sariant Maiour Generall* from him, gives order that the *Avantguard* shall draw forth, and march a good distance without, and there to stand, and make a halt, till the *Battell* and the *Rere*, be also drawne out, in obseruing a convenient distance betweene them. In the interim the Ordinance, Carriages, waggons, and baggage that belongs to the Armie, are likewise drawne out, and put into order. And the Guides, Scouts and Pyonniers sent out before into the Countrey, to discouer and to set out Centinels of Horse vpon all passages, and heigths, while the Armie is a marching forwards.

The Master of the Ordinance being present, Commaundeth where the Ordinance and the traine of Carriages belonging to them shall march. And giveth order to the Conductours, and Inferiour Officers, to march forward, as the nature and propriety of the waies will permit. And if there be any rough waies, which are to be explained, he Ordaines the Captaine of the Pioniers, and his men to make them plaine and even, likewise all the waggons of Amunition, & Viſuals with the baggage, are put in order by the Carriage Master, and conductours of the traine: but the waggons and Cars belonging to the Horse, they are ordered by their Officers, to march according to the *seigniority* of everie Regiment.

*How the Artillerie and the Carriages are to March.*

The Ordinance marches first with all the Carriages, and the Pyonniers are alwaies by them, having noe other waggons mingled among them, and so march in their order onely with one waggon before them, laden with spades, shovels, Axes, hachets, and biles, and other instruments to make the wayes, and explaine the ground and ditches, after which is drawne an Instrument, which doth make a *rut* vpon the waye, to show which way the Canon is to passe. The lesser lighter peeces of Ordinance layd vpon their Carriages, followes the said Instrument, and afterward the great peeces drawne vpon block-waggons, when there is no danger: but expecting to be encountred by an Enemy, they draw them upon their Carriages for feare of loosing time in mounting them, while an Enemy might fall vpon some part of the Armie. Next after the Ordinance followes the waggons with Instruments, and tooles for Carpenters, and Smiths, the waggons laden with Bullets, powder, and match, and after them waggons with Pikes, and muskets all which being passed; then followes the waggons belonging to the Generall of the Ordinance and his Inferiour Officers. And after them all the waggons laden with munition for the Ordinance, and the Armie, the waggons laden with Viſuals and provisions, and waggons for the sick and hurt, and last of all the baggage, belonging to the Officers of the whole Armie.

But when necessitie requires, some Feild peeces marches before in the head of the Armie, when



when and Enemie is expected to fall on, with which there marches some waggons laden with powder, match, and Bullets to be vsed vpon any occasion.

All the Ordinance, carriages, and baggage being thus ordered, and the armie devided into the *Vanguard*, the *Battell* and the *Reere*: the *Sariant Maiours* of the foote Regiments, and the Commissaries of the Horse Troupes, having received order, which way they are to leade the Troupes, that they may give noe hindrance one to an other, the *Generall*, or the *Sariant Maiour Generall* gives Command, that the *Vanguard* shall begin to march, and sends out before Guides and light horsemen, to discover the passages: yet so, that they ride not so farre afore; but that they keepe alwaies within sight of the *Vanguard*, that vpon any discouerie of an Enemie, they may aduertize and give them warning of it in time.

The *Vanguard* then (as is sayd) hath Commonly some small peeces of Ordinance marching before it, which likewise may happen before the *Battell*, and in the *Reere* of all, and a greater number of horse, and foote, as the necessitie may require, so that the three *Tercias* of the Armie, are all of them provided with Ordinance, where it is thought most needefull, and where it is imagined an Enemie may give an attempt, either vpon the *Front*, the *Reere*, or vpon either of the *Flankes*: for which one can give noe certaine rule, but must defend themselves in that place, where the occasion presenteth it selfe.

When the *Campagne* Heath or Feild, is spacious and large, then one may march in full Battaille by divisions, and close by an other in good order, which an Enemy perceiving, it may be he dares not offer battell otherwise every division, and *Battaillion*, may march by it selte with more ease and liberty, then when they are ioyned close together: yet so that in case of necessity they may easely be drawne together, as likewise the Ordinance, and baggage drawne to that place, where they may be safest, and best defended by the troupes, if an Enemy should giue an attempt vpon them.

The waggons ought to be drawne vp, and ranged into eight, or ten rancks close one to an other, that they may march without hindring one an other. and the Ordinance may march vpon one of the flankes of the Armie, and some Feild peeces before if necessity should require, without hindring, or putting the rest of the waggons into disorder, which the Master of the Ordinance, or the Carriage Master, ought to Consider well, and take a speciall care of.

The Chiefe Officer, which Commandeth the *Reereguard*, gives order that some Troupes of light horsemen, shall march with in sight of the whole *Reere*, especially, when they are to passe over a Heath, or *Campagne*: but the Countrie having mountaines, hils and vallies in yt, then the horse may be commaunded to march sometimes in the *Vanguard*, and sometimes in the *Reere* of all the Armie, and keepe watch, and centinels vpon the highest places, that an Enemy may not discover the strength of the Armie, or in what order it marches.

When the armie is to march through some narrow passages, the *Vanguard* is commonly strengthened with some foote, or Ordinance drawne vp before it, lest an Enemy might surprize it, & marches then by files, and drawes vp as the condition of the place will permit. In like manner the *Reereguard* in places of danger, ought to be strengthened, as also the *Battell* ranged into such an order, that the Ordinance, and Baggage, being placed in the middest, may come best to serve, and relieve the other Troupes, from whence they may send Harquebussiers (as occasion serves) to attend both vpon the *Vanguard*, and the *Reere*, and as the ground will best afford.

In case that the waies and passages be so narrow, that the Ordinance, Carriages, and baggage takes vp so Much time, that the *Vanguard* cannot be easely seconded by the *Reereguard*, then there may be appointed some Troupes of *Reserve*, which may march along with the Carriages, and Baggage, and be disposed of in such a sort, that they may the better relieve those Troupes which should be overcharged by an Enemy.

Vpon such an occasion, one ought to consider and observe well, the nature, and condition of that passage, through which the Armie is to march, whether there be any windings, and turnings in it, or other intricate waies, as through woods, hils and, vallies, where an Enemy may best lay his *Ambuscadoes*: therefore vpon every such turning, or crosse way,

a troupe of horse and some foote ought to be placed vpon it; to guard there, till the Ordinance, Carriage, and Baggage be past and out of danger.

*How one is to march through a wood.*

But in passing through a Forrest, a great wood, or a Grove, there ought to be placed good store of Horse, vpon the waies that goes into it, and where the Armie is to passe, and to round and guard it well, as well on the one side, as on the other. And if there be any plaine, or open places in it, the Horse are to overspread it, and to draw there in Battaille for the securing of the passage, till the Ordinance and Baggage be all past, and that the foote, and Horse follow, which are appointed as a Reserve to bring vp the Reere.

The Armie then, having passed through a wood, and come againe into a plaine *Campagne* or Feild, some Horse are to guard the way that comes out of the wood, till the Horse troupes are drawn vp in those Feilds, and are possessed of the heights thereof.

*How, and in what manner an Armie is to passe over a River.*

When an Armie is to march through a Countrey, wherein there are Rivers and Brookes; The States Armie carries continually along with them some ten or twelve boates, having plancks Spars, Beames, ankors and Cables laden in them, and vpon those *Block-waggons* that are drawne with some ten, or twelue couple of horse, which comming to a river they presently take them downe, casts out their ankors, and laies them over the river, as broad as it is, & as many as they have vse of, ioyning them together, laying the beames, plancks, spars, & boards vpon them, and so in an instant, claps ouer a bridge, over which the Armie, Ordinance and Carriages may passe without danger. Sometimes also for expedition sake, they lay over bundles of floate or slag bridges bound vp in Canvass, as also they make a bridge with Barrels, Hogsheads, in laying spars and planckes vpon them, being clasped and fastned hard together: so that foote & horse, and some small Feild peeces may march over them.

A Bridge then (having good Ingeniours, Carpenters, and workemen) is presently made over a River, or a brook, for the securing whereof there are certaine peeces of Ordinance, drawne vp, and planted by the river side, to play vpon an Ennemie, if they should oppose the passage over it, and likewise drawes vp some *Harquebussers*, lighthorsemen, firelocks, and muskettiers, to give fire vpon an Enemie, while the bridge is a making. As soone as the bridge is layd over, some firelocks, halfepikes, and horse marches first over it, to maintaine and make good the other side of the river, till all the Armie and carriage be come over, and takes also along with them foure or five small peeces of Ordinance, to scoure the passage, a waggon laden with powder, and amunition, and some Pionniers to make the waies, hedges, & ditches plaine, & expecting an Enemie at hand, commonly cast vp a trench or a worke on both sides of the bridge, having some 500 Souldiers to guard it, till the Armie and all the Carriages and Baggage be passed ouer it.

Now if an Enemie should seeke to oppose, and hinder your passage over it, the Ordinance, horse, and firelookes above mentioned are placed purposely vpon the Rivers side to free the passage, and to cleare the Coast.

FIRST,



FIRST,  
OF THE ORDERING, AND FORMING  
of a Devision, or a Battalion, and then the forme of an Army of thirty  
thousand Horse, and Foote ranged in Battell.

**T**He ordering of a Regiment, according to his highnesse the *Prince of Orange* his command, hath bin showne already in the first part of this book, namely, that Companies being made into even files, and ten deepe, foure, or five Companies, ioyned together make a division, to wit, the Pikes are drawne first into one bodie, and then the Muskettiers into an other, standing in their true distance of there foote in file & Ranke, and 18 foote distance betweene the Pikes and the Muskettiers, this is the first order. The second is, when the Muskettiers are equally devided, as neere as may be, and drawne vp on the right, and left flankes of the pikes, there to giue fire by Rankes, or to march away, as these two first figures marked with number 1 and 2 doe shew.

Now the fittest number of men to make a devision of, is accounted to be 500 Pikes, and Musketteires, that is, 25 files of Pikes, and 25 files of Musketteires, or more, or lesse of the one or of the other, as they fall out.

This number being so embattailed makes an *Agile* bodie, and the best to be brought to fight, and two of them being ioyned neere one an other, can best second, and releiue each other, better then your great *Phalanges*, which are unweeldy bodies, the experience whereof was seene in the Battell of *Nieuport*: for being once broken, and routed, they can hardly be reallyed againe, and cannot bring so many men to Fight, as the Lesser Bodies doe.

Many of these Devisions being drawne together make a *Tercia*, or one of the third parts of an *Armie*, and three of them the whole.

For all the Officers and Souldiers of an Army, are devided into three parts called *Brigades*, or *Tercias*, each of them having a severall name, to witt, the *Vanguard*, the *Battell*, & the *Reereguard*.

Now that *Tercia*, which is to march first, is called the *Vanguard*, that which marches in the midst the *Battaille*, and that which comes vp last the *Reere*. Everie one of them vpon a march every day takeing their turnes interchangeably: for the second day of the march, the *Battaille* becomes the *Vanguard*, and the *Reere* the second day hath the *Battaille*, and the third day the *Tercia* which had the *Reere* the first day is the *Vanguard*.

Moreover, each *Tercia* may likewise be subdivided into a *Vanguard*, a *Battaille*, & a *Reere*, to the end each of them with the more convenience may be orderly brought to fight, and by that *Cheife*, which commaunds them.

Therefore, the *Battaille* one of the *Tercias* of the Army, being placed in the midst, that of the *Vanguard*, may be drawne on the right, and the *Reere* on the left flanke of the *Battaille*.

Now the number of the devisions, which each of these *Tercias* haue, are ordered, and devided after this manner, two devisions before, two in the midst, and two behind, standing aboue, as you may see in some of the figures of the *Battells* following, having six or 7 devisions placed in euerie *Tercia*. The seventh being vneven, is placed as a *Reserve* behind the *Reere*, to second the others in time of neede.

The first devisions of the *Tercias* standing in a right line, are to give the first charge, according to the order of their *March*.

The second devisions standing likewise in a right line, makes likewise the second troupes and the third part of the *Battaille*.

Now these devisions are so ordered and ioyned, that if the first should be overcharged and come to giue ground, then the second are to come vp, and to releiue the first, yet in such a distance, as they may not hinder one an other in marching by them, but finde place to come vp betwixt the first.

The third devisions are to be placed directly behind the second, in a distance twife as much



as the second is from the first, that if it should happen, that the first division should stand behind the second, that then the third might have roome enough, to put it self into good order.

The Horse Troupes are commonly ordered, the one halfe on the right, the other halfe on the left flanke of the divisions, and Battaillons of foote, as the first figure of an Armie demonstrates.

And sometimes there may be *Battaillions* of Horse interlaced, and placed betwixt the intervals, and distances of the Foote, as the ground and necessity may require. For, if an Enemies Horse should be ranged betweene his *Battaillions* of foote, it is needefull then, that the other side should observe the same forme likewise, and have horse to encounter horse, least they should breake in vpon the foote divisions, and so by this meanes they may with the more convenience second, and relieve one an other, otherwise the Foote being overlayd with an Enemies Horse, having not Horse at hand, to charge and second them, might be easily routed and overthrowne, and though an Enemy have not placed Horse betweene their *battaillions* of foote, yet it may easily be done, according to the discretion and foresight of the Generall. All which shalbe clearly demonstrated to the Eye by figure first in beginning with an Army of six thousand Horse, and 24 thousand foote embattailed into three Tercias, with their severall divisions, and afterward I will show the grounds and platformes of the Battail of *Nieuport in Flanders*, fought (Anno 1600) betweene *Prince Maurice* of famous memorie, & *Albert Arch Duke of Austria*, and then proceede on to represent vnto you the formes of Battailles shown by the Prince of *Orange* abovesaid, & his highnesse brother the Prince of *Orange* that now is till Anno 1635, which may giue some satisfaction to those, which are desirous to follow the profession of a Souldier.

*The Demonstration of the figures following,  
marked with great A. and B.*

*after p. 194*

**T**he two first figures, marked with the figure 1 and 1 are two Divisions of 25 files of pikes a peece, and ten rankes deepe, ranged in Battaille.

The second two figures noted 2. and 2. are two Divisions of muskettiers, consisting also of 25 files a peece, and 10 Rankes deepe as abovesaid.

Now if you are desirous to alter this forme, and divide your Muskettiers into two parts, then you may draw vp 13 files on the right flanke, and 12 files on the left flanke of the Pikes, and giving them their true Intervals and distances for the Muskettiers to fall away, then there are two divisions made of a Regiment, and they stand as is shewed vnderneath, marked with the figure 3.

The figure B represents the forme of an Armie embattailed, consisting of 24 Regiments of foote, each Regiment making two divisions of 1000 men, and 20 divisions of Horse Caraffiers, and Harquebusers, each division consisting of 300 Horse, making six thousand Horse in all ranged into three Tercias, with the true number of feete, and distances betweene them, as the figures shewes.

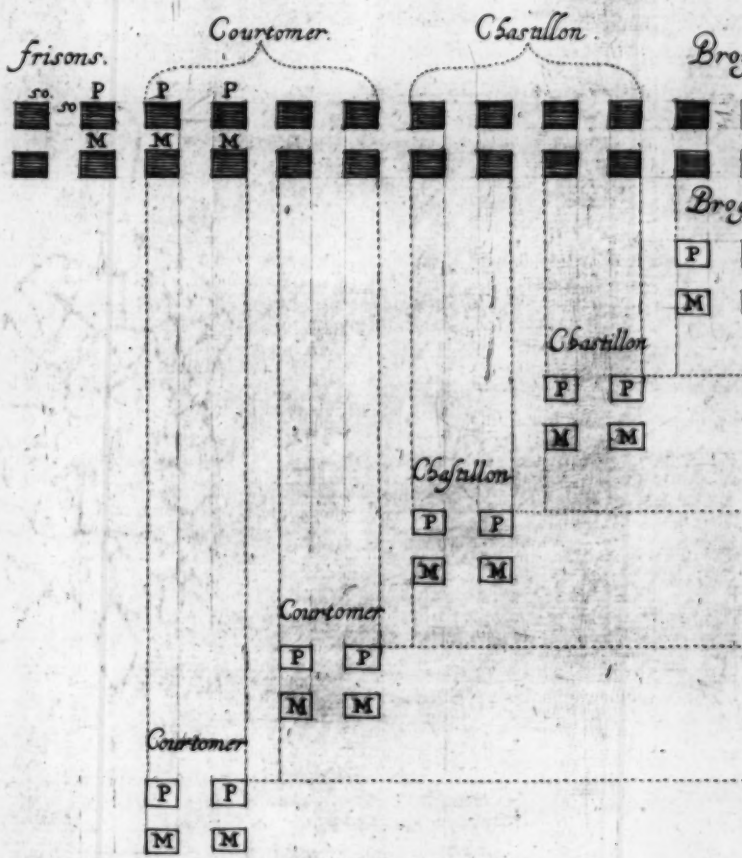
Note also, where the gentle Reader sees a P marked within the Devision, that signifies Pikes, and the devision underneath are musketteirs marked with the Letter M.

To conclude, the Horse are noted in French with C for Cavallerie, and in English with H for Horse.

The figures that are Coloured are distinguished thus. The Pikes with a yellow, the Musketteirs with a green, and the Horse with a red colour.

# Ordre de bataille d'Infanterie, ordonné par

The second forme of a Battle of foote ordered by Mau



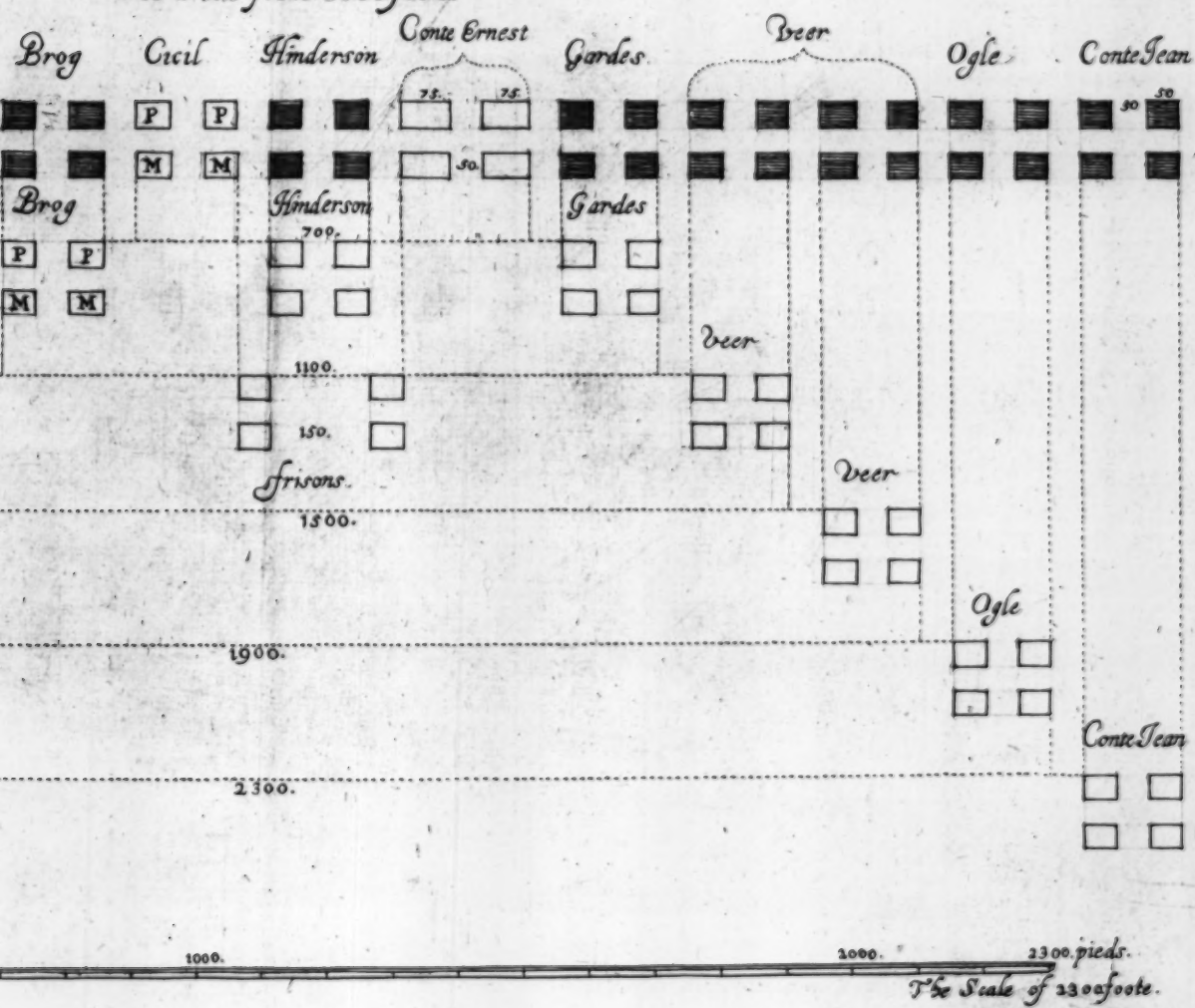
E

100.

par le feu Prince d'Orange Maurice, de tres-haute memoire. L'An 1605.

Maurice Prince of Orange of famous memorie before Rees Anno 1605.

The whole front. 2600. foute.





# THE ORDER AND FORME OF QUARTERING and Encamping of an Army.

**H**AVING showne the figures of Generall *Formes*, and orders of embattailing, ranged in the wars of the vnited Provinces, vnder the Command of his Excellency *Maurice Prince of Orange* of famous memorie, and his Highnesse *Frederick Henrie Prince of Orange*, our Captaine Generall that now is: I will proceede on and shew how, and in what manner an Armie ought to be encamped, with the severall diuisions of their quarters, beginning first with a Company of Foote, and Horfe, then with a Regiment, and afterward an Armie entrenched, and last of all come to handle *Approches*, and all things depending therevpon, for the beseiging and takeing in of a Towne or Fortresse: which for the most part, I have translated out of *Mr Adam Fritach*, an excellent Mathematician, in his booke printed. Anno 1635.

## THE FIRST CHAPTER.

*Of three sorts of Campes or Leagers.*

**T**HERE are three kindes of *Campes*. The first is called in Latine *Castra Temporanea*, that is, A *Campe* which staies not long in a place, but removes and changes euery day: the second *Castra Stratarta* a settled *Campe*; which environeth a Towne, or a Fortresse with intent to take it in, and the third is called *Castra Sustentoria*, a *Campe* lying vpon a passage, or river to stop and hinder the incursions of an Enemie from getting into a Countrie.

*The Campe which dislodgeth euery moment is called Castra Temporanea.*

This *Campe* is also called a *Flying Leager*, having no certaine place of abode, but at every motion, is continually to attend an Enemie vpon every remove, and this Armie is to encampe, when the Enemies Armie encampeth, and therefore is called a *Flying Campe*, because it is to hinder the Enemies progresse.

*A Campe having a trench Cast vp about it, or beset with Turne Pikes and Palissadoes.*

Now for a *Campe*, which is ready to remove vpon an instant, we vnderstand that, which takes vp a quarter onely for one night, which forme requires a great deale of wisedome, and circumspection, especially when it is to march, or Quarter not farre from an Enemies Countrie. Therefore, it is very necessaerie, that the *Generall* sends out before, a good number of Horfe, to view, and informe themselves of the nature, and condition of that place, where the Armie is to Quarter that night, for the accommodation where of, they ought to chuse, as neere as possioly may be, a place situated in a plaine Feild, to which the Armie being come (and that in good time by day, the Quarters shall be made neere vnto the adioyning villages) if there be any and the Horfe lodged about them, in places of danger most suspected. A campe may be encompassed with a Trench 4 foot high, and 3 foote broad for their more safety against an Enemie, which otherwise might give an attempt vpon some part of the Armie. The moorish grounds, where an Enemie is not feared, that may be beset with *Turne Pikes*, or with *Palissadoes*, which may be taken vp againe, when the *Campe* removes.

After the Trenches are in defence, the Souldiers begins to make their huts of forks, lathes, withes and straw, or for a night onely with sticks and boughes, or such things as they can get, the carriages and waggons laden with Amunition, Materials, and Victuals are to be lodged in the middest of the *Campe*, with a small trench cast vp round about them; but some peeces of Ordinance are to be planted vpon those *avenues* and passages, where an Enemie may best give on vpon the *Campe* when the watches, and the Centinels are disposed of, the rest of the Armie goes to take their rest, the next morning at the breake of the day and at drummes beating the Armie dislodges, and every one makes ready for to march

(A)

march away, while the trench is a Casting downe, lest an Enemy, which followes the Armie might lodge in the same quarter.

But if the Armie is not to march through an Enemies Countie, and that one is assured they cannot come neere vnto the Campe so soon, it is not necessarie to environ the Campe with trenches, but the Souldiers are either Quartered in houses, or fields next adioyning to them, in disposing of guards, and Centinels in every place needfull, and this order of march is observed every day, till the Armie is come vnto that place, which is resolved to be besieged, where then a formall, and a settled Quarter called *Castra strataria* is made.

*Castra Strataria and the proprieties thereof.*

The propriety of this Campe may be observed well out of the Instructions of Veget in the 22 chapter of his first booke, as also in the *Castrametation* of Hyginus Gramaticus, according to these observations following.

First, that the Quarter be made in a safe place, that is, where there are no hills and heights, which may commaund and serve as an advantage to an Enemy, when he resolves to relieve the Towne, or Fort besieged, or to assault the Campe; for being lodged and fortifying himself vpon them, he may easilie overlooke the Campe, and then it is subiect to be played vpon by an Enemies Ordinance.

That it be made (if it be possible) neere vnto some brooke or river, which may commodiously serve, aswell, for the watering of Horse, and Cattel, as also for the Souldiers, and by which, with shipping, or boats one may bring vp Munition with provisions, and Victuals to the Campe, by the helpe of a running river, or the winde for the fying of excessive charges, when one is driven to bring them vp to the Armie by *Convoies*, and waggons, which oftentimes causeth a death in the Armie: for commonly Victuals, and Souldiers raises the price of their Victuals, and commodities, according to the length of the way, if they be constrained to bring them vp by waggon hire. Besides, it is a great advantage for a Quarter, to lie by a river side, because sometimes the water may be carryed round about the Campe, which will make it stronger, then if it were lodged in a plaine Feild, and fortified with some small Forts, and Redoubts; so that all that charge is saved in making of workes, if the Campe may commodiously be enclosed about with water. I say nothing of the great stinke, caused by dead Horse, and beasts, as also by Butchers and their shambles, which likewise is avoyded by the helpe of Water, neither are men so subiect to sickness, and pestilence, which takes away many times a greater number of people, and weakens an Armie more, then if it were assaulted by an Enemy. For, the prevention of which inconvenience, the Carrions, panches, and garbidge of Beasts are cast into it, and carryed away with the streame, and the Butchers quartered in the most remote part of the Campe.

One must also have a speciall care, that there bee no thick-bushes, and woods about it, where an Enemy may lie in *Ambuscado*, or fortifie themselves without any hindrance, which would keepe a Campe in Continuall feare, of being assaulted by an Enemy out of a wood.

To make choise then of the fittest places, to encampe and Quarter in, those are held the most commodious, which are situated in a plaine Feild, seeing an Enemy may be discovered a far off, having then time to draw into Armes, to oppose them, and that the Canon may play vpon them, in case an Enemy would attempt to assault the Campe by force.

As many sicknesses are engendred by stanch, and the purification of the aire: so likewise many are caused by Moorish grounds, *Marras*, and bogs, in regard of the damps, and fogs, which riseth out of the waters, as also poysonable vapours, arising out of marshie grounds, wherevpon the Souldiers huts are built.

Therefore one ought to be well informed, before a Quarter or a Campe be made for an Armie, whether those grounds bee covered or overflowne with water, which may often happen in *Autume*, or *Winter*, which were a great annoyance, and hurt to the Campe, if it were driven to stay there all winter, and that one knew not the Condition of the place. Again, it may serve for some use to helpe the besieged, or those which come to relieve the

Towre



Towne, when they may turne the water by some places into the Campe, or can cut some dikes or Seabanks, or keepe vp the water by banks, and sluices, to make it overflow the *Campagne*, which will bring a greater dammage to the Campe, then fire would doe; therefore one ought to consider, and ponder well all these things, and to thinke vpon some remedie to prevent these inconveniences.

One ought also to make choise of such a place, which yeelds good store of grasse, and hay for Cartell, and straw for the accommodation of the Souldiers; because the want of fountage for Horse, will constrain them to fetch it farre by conuoyes, which is dangerous for the Souldiers, when an Enemie lies vpon the snape for them, and their Horfes in those places, where they are driven to fetch their fountage, which one is forced to doe with great *Conuoyes*, and excessive expenses. Also there must be care taken, that there bee no want of wood for firing, and building of Souldiers huts, as also straw serving for the same vie.

A Campe ought not to be quartered too neere the Towne Besieged, lest the Enemie may reach it, and doe great annoyance to it with his Canon, neither ought it to be quartered too farre off, but that one Quarter may with expedition relieve one another, as also those which worke in the Approches, if the besieged should fall out vpon them, therefore the furthest, and the nearest distance for the better safety of the Campe, is to lie without Canon shot.

The Circumference, measure, greatnesse, and largenesse of a Campe, ought to be answerable to the greatnesse or litlenesse of it; for one must not make a place too litle for a great Armie, neither a place too great for a small Armie: for the one will not be able to defend the Campe; because of the smallnesse of it, and the other not able, and sufficient to defend a great place.

Finally, it is a point of great consequence for a Campe, to have all the *avenues*, and passages that comes to it well guarded, so that an Enemie cannot lodge neere it, to hinder the provisions and Victuals which comes to it, for want whereof many times an Armie is forced to rife.

A Campe then being endowed with all these *Proprieties*, no question but it is well settled. But seeing that such places are seldome found, which answers to all these proprieties discribed above, one must accommodate themselves, according to the propriety of the place, and repaire that by Art, which is wanting by Nature.

If there being any hills, or *heights* in it, you much Quarter, and lodge vpon them, when the nature of the place will afford it, or if there be any other commodious place neere vnto the Quarter, it ought to be taken in, and environned with a Trench, and a Redoubt made in it, and Ordinance planted vpon it. But this heigh being situated vpon a passage, or place of importance, a Fort is made vpon it in taking away, as much as possible may be all advantage from an Enemie.

The seige of the *Bosch* may give vs an exsample herein, where there was a heigh situated vpon the way, as you go to *Vliemen*, and towards the Longstrate, vpon the top of which hill, a fouresquare Fort was made with foure *Demy-Bulwarkes*, and besides a *Crowne-worke* before it, and before that as a surplus, there was made a *Horne-worke*, all which workes were neverthelesse environned with the line of circumvalation, which encompassed the whole Armie: for the Enemie could hardly assault the Campe on this side, because the hill lay so, that it commaunded all the grounds about it.

When there is no River, then all necessaries, and provisions must be brought to the Campe by waggons, wherevpon care must be taken, that the waggonmen and Sutlers set not too high a price vpon their provisions, and Victuals, which might cause a Dearth and scarcity in the Army.

For the avoyding of stincks and noisome smels, the dead Carions of horfes, and other Beasts ought to be carryed and buried farre off without the Camp and Quarters, to which order also the Butchers are subject, for the carrying away of the panches, and Entrailles of the Cattel which they kill, and to bury them in pits without the Campe.

The woods, thickets, and groves, which stand not farre from the Campe, ought to be taken in within the Trench, when it may conveniently be done with a small charge, which



wood and timber may serve for firing, and other good uses. But when they lie too farre of, and cannot have all within the Compasse of the line of Circumvalation, which may be dammageable to the Campe, then they are cut downe, and burnt, lest an Enemie might lay any Ambuscadoes in them.

Also, having a water, or a river, which may be stopped by the Beseiged; so that in time, it might overflow the Campe, one ought to take a singular care by hindring it, and casting vp of some bank to stop it, and carry it about the Campe, to discharge it self elsewhere, which necessity, and experience will teach one.

All these things then being maturely considered, and overweighed, after one is well informed of the nature, and condition of the soile, lying about the Towne, or Fortresse, which is to be beseiged, and being come within two or three Dutch miles of that place, the Quartermaster Generall before the Armie rides out with some 80, 100, or a greater number of Horse, as necessity may require, to view the towne, or Fortresse to be beseiged and considers well the soile and grounds that lies about it, and draws a draught and platforme of them, that he may the better distribute, and give out the severall Quarters.

All Quarters are not alike over all, and of one and the same forme, but one must accomodate himself many times, according to the site of the place; for sometimes one must content himself with one Quarter alone, and otherwhiles the Campe may be divided into two, three, foure, or many Quarters.

The Forme is also diverse, seeing one must governe themselves according to the situation of the place, The largesse must be answerable to the number of the Regiments, which are to be Quartered, and which shal be handled in the next chapter.

THE

THE SECOND CHAPTER.  
OF THE DEVISION OF HVTS FOR  
Officers, Souldiers, and Sutlers.

Together,

*With the true measure and distances of them, according to his Highnesse the Prince of Orange his new Order for a Regiment, and for the quartering of the Captaines in the Reere, for the preventing of fire, and disorders.*

**B**Efore wee come to the diuision of the ground, appointed for the Quartering of a Regiment of foote, it will be necessarie to discribe first, how much ground, commonly a Companie of 120, or of a 150 and of 200 heades must haue, which may serue then as a Generall rule, in the distribution of the quartering of severall Regiments, containing diuerse Colours, and Companies vnder them.

First for a Colours of 120 foote, there is ordayned three hundred foote deepe. But the bredth must be according to the number of the heades in a Company, which are some more some lesse: For a Company of 100, or 120 heads must take vp 24 foote in bredth, that is, two rowes of Huts, and a street betwixt them, a Companie of 150 must haue 40 foote in bredth, to wit, three rowes of huts and two streetes, and a Collonels Companie of 200 heades, requires 56 foote in bredth, that is foure rowes of Huts, and three streetes, besides the back streetes, which are betweene Companie and Company.

As for Example, the *Quartermaster* hath giuen him a *Parallelogramma* of ground, which is 300 foote deepe, and 24 foote broad for a Companie of 120 heades, which he deuides thus, from the Lieutenants and Ensignes hutts downeward to the Sarians hutts in the Reere, he giues 180 foote deepe for two rowes of huts, and as is said a streete of eight foot, which makes 24 foote in bredth as abouesaid. Then there is a street of 20 foote between the Reere of the Sarians hutt, and the boughs of the Captaines hutt: next the Captaine hath allowed him 40 foote in depth and some 20 foote broad (because a passage for the Souldiers must not be stoppt vp) for him to build in; Then betweene the Reere of the Captaines, and the Sutlers hutts, there is a large streete of 40 foote made for the passage of men and waggons, and for feare of fyre. And last of all, there is 20 foote allowed for the depth of the Sutlers hutts, to wit, ten foote for the forepart of his hutt for eating and drinking in, and 10 foote for his Kitchin, and this is the distribution for a Companie, which must take vp (according to the Princes new order) three hundred foote in depth.

The bredth of a Quarter, is according to the number of the Heades of a Company.

In the depth of 180 foote for the two rowes of huts aboue mentioned, there may be made in each row, twentie or two and twentie Hutts with a distance of two or three foote betweene every Cabin, for the avoyding Eues-droppings and a little trench to receiue the Water made betwixt them.

The doores of the Lieutenants, and Ensignes Cabbins commonly opens towards the Front, and the Armes, and the Alarme place, but the Sarians towards the Reere.

The Souldiers doores open opposite one to an other, that vpon any occasion they may presently draw out into Armes, all which parts shalbe discribed in the figure for a Regiment (of ten Companies) following.

(B)

HIS

**HIS HIGHNESSE THE PRINCE OF**  
*Orange* his new Order, and Forme for Quartering of a Regiment of  
 ten Companies of Foote, to wit, the Colonels being  
 200, the Lieutenant Colonels 150, and  
 the Captaines 120 Heads.

**THE DEMONSTRATION.**

**A** is the Colonels Hall, Gallerie, and Pavillion,

**B** are two huts for his servants.

**C** the Kitchen.

**D** Two huts for the Butler, a Cellar and a pan-  
 try.

**E** The Stable.

**F** A place for his Waggon.

**G** The Captaines huts.

**H** The Quartermasters Hutt.

**I** The Preachers Hutt.

**K** The Chirurgians hut.

**L** The Lieutenants huts.

**M** The Ensignes huts.

**N** The crutch for the musketts.

**P** The Crutch for the Pikes.

**Q** The Alarme, which is 200 foot between  
 the head of the Quarter and the Trench.

**R** The Provost-Marshal's hut and Prison.

**S** The Searants huts.

**T** The Backstreetes betweene each Companie.

**V** is 20 foote between the front and the furthest  
 side of the Pikes.

The breadth of the whole quarter for these 10 Com-  
 panies, is 436 foote.

The Coronells division, 84 foote.

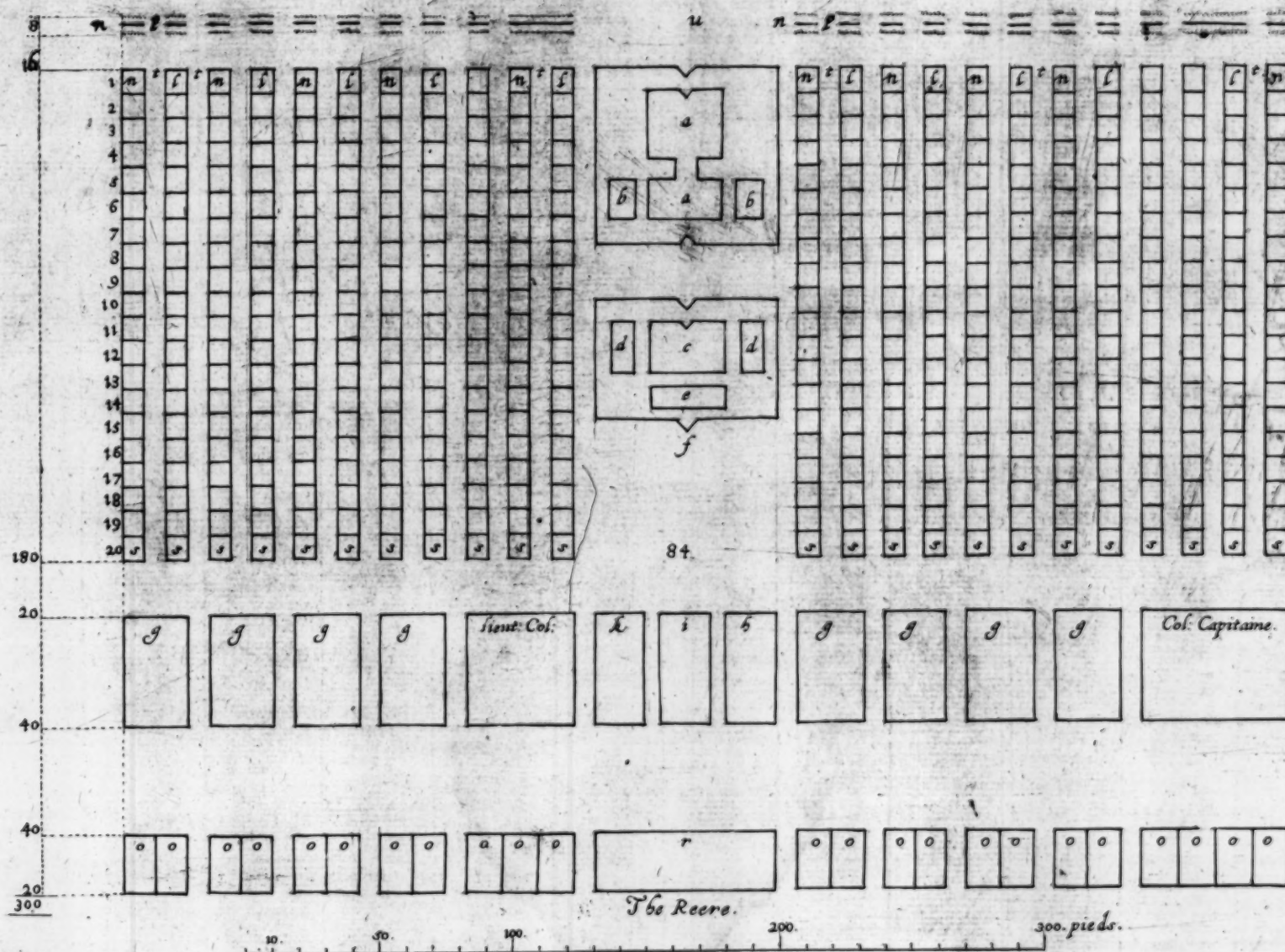
**THE**



Quartier d'un Regiment d'Infanterie de dix Compagnies, selon l'Ordre de son Altesse: le front a 434 pieds.

His Highness forme for quartering of a =  
Regiment of ten Companies: the front is 434 f.

The alarm place 200 foote.



*practised in the Warres of the United Netherlands.*

7

## THE FORME OF QUARTERING OF A

*Regiment of Horse, consisting of five Troupes, according to the Prince of Orange his new Order, the Captaines being quartered in the Reere.*

### THE THIRD CHAPTER.

**F**Or euerie Cornet of Horse, there is ordayned (as the foote are) a depth of 300 foote, the bredth is not alwaies alike, but must be given according to the greatnesse, and smalnesse of the number of heads, serving vnder the said Cornet.

A Cornet then containing a hundred Horsemen, must have a place of 300 foot deep, and 70 foote broad, wherein they are to lodge, and content themselves.

The Captaines Hutt of the Troupe, with his boughes is 70 foote broad, and 40 foote deep, being a part of the depth of the 300 foot abovesaid.

Betweene the Reere of the rowes of the Horsemens Huts, and the Captaines, there is a street of 20 foote, and the two rowes of the Horsemens Huts (as the foot is) is 180 foot deepe, to wit, from the Lieutenants, and Cornets Huts in the front, to the Quartermasters and Corporals in the Reere, which makes in all two hundred foote deepe, and 70 foote broad, the room for the Huts in each row is ten foote, after which there is a small streete of 5 foote, in which the Huts have their doores, and commings out. For the Horse there is a space left of ten foote on both sides, also betweene the two rowes of Horse, there is a streete of 20 foote broad, seing that the Cornet consists of no more then of 100 Horse, so that there are placed 50 Horse in one row, and 50 in another, and every Horse is allowed 4 foote in bredth, and 10 foote in depth, which is the space also appointed for his Master.

Betweene the Captaines Hut, and the Sutlers, there is also a streete of 40 foote for the same reason, as wee have discribed in the Quartering of foote. after which there is a place for the Sutlers Huts, which is answerable to the breadth of the Cornet 70 foot, and for the depth of his fore Hutt 10 foote, and for his kitchen 10 foote more allowed him, so that the true dimension for the Quartering of a Troupe of 100 Horse, is 300 foote deep, and 70 foote broad.

But a greater Cornet consisting of 140 heads, (or it may be 150) then they have given them a row of Huts more, so that they must have in all three rowes, of which the last standing alone, is separated from the second by a streete of 10 foot, which reacheth from the huts of the second row, and the Horse are set behind this new row, after which (as before) there is a depth of 10 foote for a Horse, and a small streete of 5 foote, and for the Huts of the Horsemen likewise 10 foot, whence followeth, that the breadth for a Cornet of Horse of 140 heads takes vp 105 foote, for the two rowes taking vp 70 foot, if you adde thereunto the two streets, the one of 10, and the other of 5 foote, with the distance left for the Horse, and the Horsemen, making 20 foot, it is in all 35 foote, you shall then have the breadth of 105 foot for a Cornet of 140 heads, and the depth of 300 foot as before.

Note that euery Horse hath his head standing towards his masters hut, that vpon any occasion his Master may goe directly to his Horse, without going about his hut.

The space being deepe enough for the huts, they neede not build them close one to another, but leaue a little distance of a foote and a halfe, or two foote at the most betweene the Hutts: but betweene every fifth and sixth hutt, there is an open space left of some 6 or 8 foote, for the Horsemen to draw out of, if necessity should require.

The Hutts which the Horsemen build, are built in the same manner as the foote are, saving that they take vp more roome, for the depth of the Hutts for the foote, is but 8 foote, and the Horsemen must haue ten.

The two first Hutts in the head of the Quarter is appointed for the *Lieutenants*, & the *Cornets*, and the two last in the Reere are ordayned for the *Quarter-masters*, and the *Corporals*.

Before the Horse, (between the Hutts and the streets) there are mangers made for the Horse with boards, or plancks fastned and nailed together, which stand vpon posts driven



into the ground, and have Sailes covered over them, from the one side to the other, and because many Horſe are of ſuch a nature and condition, that they will not ſtand together, there are poſts tyed between them, that they may not ſtrike, and hurt one another.

Now if there be any likelihood, that it may prove a ſettled *Camp*, or *Leager*, then they may alſo build Huts for their Horſe, to keep them from cold and Sun. Theſe Huts are covered with ſtraw, as the Horſemens are, but are open before and behinde, (becauſe every Horſeman may have an eye to his Horſe) ſo that they are but onely covered over head on both ſides, which coverings are alſo made oftentimes with ſuch Sayles, as Tents are commonly made of.

But the Horſe being come to ſuch a place, are commonly lodged and quartered firſt in Villages, houſes, and barnes, if there be any thereabouts, at leaſt wife till they have built them huts for themſelves, and their Horſe. But finding no Houſes, Stables, and Barnes, or ſuch like accommodations for them, then they will be conſtrained to let their Horſes ſtand uncovered, till they have built their owne Cabins, which being done, then they may make their Horſes.

The *Ichnographie* of a Quarter for a whole Regiment of Horſe, *Harquebuſiers* and *Cavaffiers*, conſiſting of five Cornets, each of a hundred heads, ſhall be demonſtrated in the figure following.

### THE DEMONSTRATION.

*A D r s*, is the Colonels, Sarjant Majours, and Captaines Huts, being 70 foot broad, and 40 foot deepe.

*L i*, and *C o r*, are the Lieutenants and Cornets Huts in the Front of the Quarter.

*Q u*, and *C*, are the Quartermasters, and Corporals Huts in the Reere of the two rowes.

*r a*, *c g*, a Street of 20 foot, between the Quartermasters, Corporals, and Captaines Huts.

*a b*, and *g i*, is the depth of 180 foot, for two rowes of Huts, from the Lieutenants, and Cornets Huts in the Front, to the Quartermasters, and Corporals in the Reere.

*a k*, *b c*, *p g*, and *h i*, is the breadth of ten foot, for the two rowes of Huts.

*k l*, *c d*, *o p*, *q h*, is the ſtreets between the Huts, and the ſtables for the Horſe, being 5 foot.

*m n*, *e f*, is the great ſtreet of 20 foot, for the whole troupe to draw out in.

From *b* to *t*, is a large ſtreet of 40 foot, for feare of fire, between the Reere of the Captaines Hut, and the Front of the Suttlers.

*C n*, is the Suttlers Huts, that is, 10 foot for the forepart, and 10 foot for the afterpart for their Kitchens.

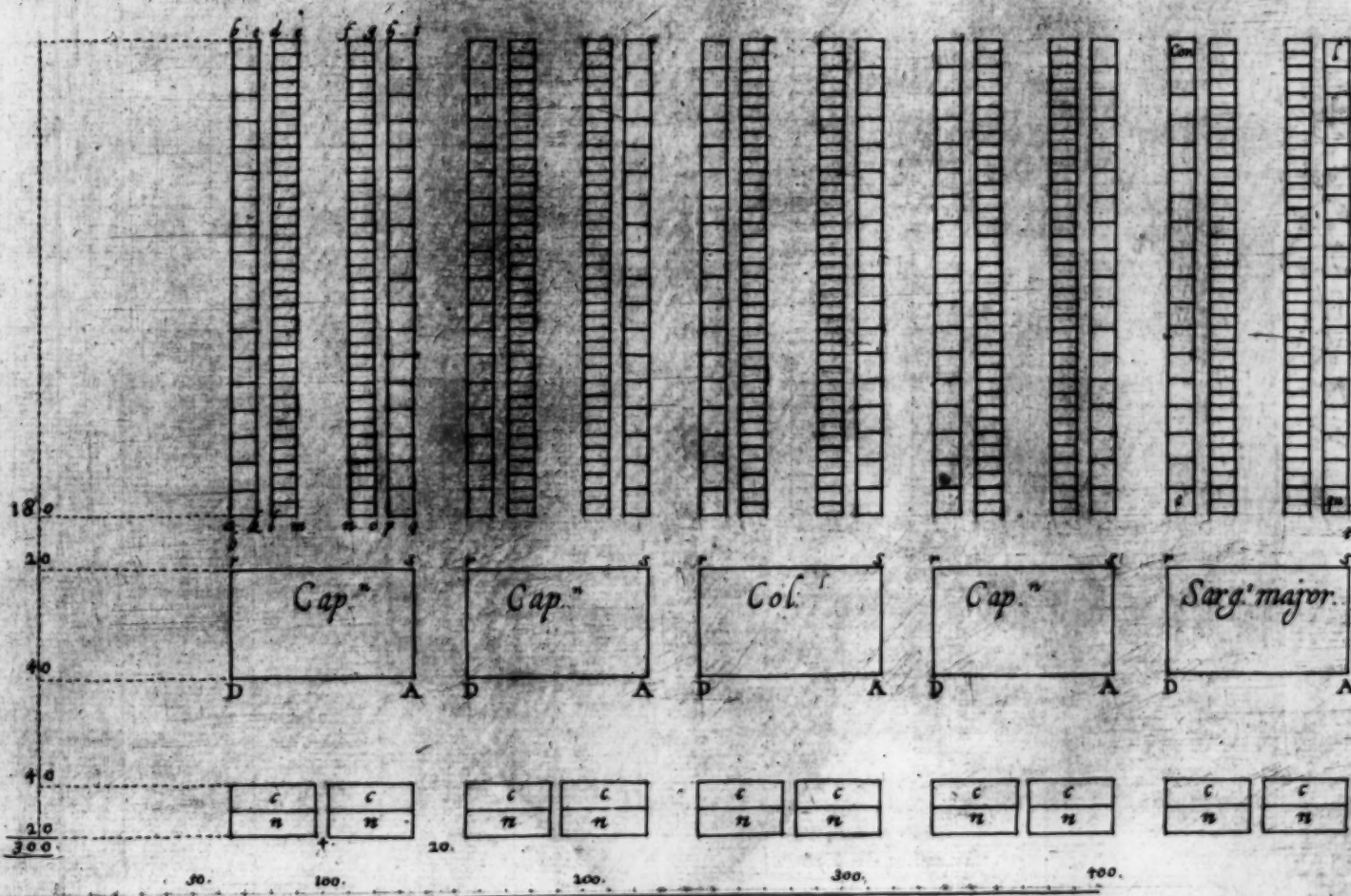
Note, that a Colonell of Horſe is allowed no more ground, then a Captaine of a troupe is, onely this preheminencie he hath, to be quartered in the miſt, and if his troupe bee ſtronger, then a private Captaine is, then (as is aboveſaid) he is allowed him more ground, and another row of huts, and thus much for the Quartering of a Regiment of Horſe.



Quartier d'un Regiment de Cavallerie de 5. Compaignies selon l'ordre de son Altesse.  
 le front à 430. pieds.

His Highnesses forme for quartering of a Regiment of Horse, consisting of 5. troupes.  
 The front is 430. fote.

The Alarm place 200 fote.



Of Particular Quarters.

**B**esides the Quarters aboue mentioned, there are also Particular Quarters in a *Campe*, which ought to come into consideration, to wit, The *Generalls*, The *Generall of the Ordinance*, the Quarter for the Canon, Carriages, and waggons, as also some other Quarters, which shall be described as followeth.

The *Generall* hath a square place of Ground giuen him, which as a Regiment is 300 foote deepe, and 600 foote broad, and his Tents and Pavillions sett vp, and disposed of as the *Generall*, and his *Tent-master* shall thinke fitting.

Also there is giuen to the *Generall of the Ordinance*, a depth of 300 foote, and a breadth of 480 foote for him, and his traine of Ordinance, Officers, and Handie crafts men to Quarter in, hauing a little trench cast round about it.

In which ground also, is buile a foure square Redoubt with haire cloth ouer it, to laye in powder, and Fireworkes, for feare of fyryng, and to keepe them from wetnesse, and raynie seing they are not so combustibile and will not take fire so soone, as straw, or sailes will.

There is also a place ordayned of 300 foote in breadth, and depth for some chiefe Officers of the feild, which are not lodged within the Regiments.

The waggons also haue a certaine place giuen them, that they may giue noe hindrance to the *Campe*. The depth is also commonly 300 foote, but the breadth must be answerable to the number of waggons.

The *Market place*, where Marchands, viculars, Tradesmen, Butchers, and Bakers are lodged haue a depth also of 300 foote giuen them, and is some 400 foote broad, in the midst whereof there is an open place left for the market place, and the sides are diuided into rowes of hutts and streetes. They make ordinarily eight rowes of hutts, whereof foure are sett upon the one, and foure vpon the other side, every hut being ten foote broad, and betweene every two rowes of hutts, there is a streete left some 10 foote broad.

The first two Rowes of hutts next to the market place, are appointed for *Mercers* wolen and linnen Drapers, and some other choise wales. The *Tavernes*, and *Ordinaries* takes up the second, the third are for handicrafts men, and the fourth for Butchers, and Bakers.

There is likewise a vacant place left for the lodging of *Voluntiers* and *Strangers*, which hath noe certaine measure, but must fall out, sometimes more and sometimes lesse as occasion serves, and this is the description of a quarter, or *Campe*, both in generall and particular, as neere as may.

*[The following text is a mirror image of the preceding paragraph, appearing upside down in the original document.]*

**THE**



## THE FOURTH CHAPTER.

**T**He *Quartermaster Generall* makes first a Scale, which will serue for a sheete of paper, fitting it according to the proportion, as the said paper will beare, either greater or lesser, and then makes a draught vpon it. According to the measure of this Scale, he drawes out vpon this, some *parallell* lines of 300 foote deepe, which shewes the depth of every quarter, with some other *parallell* lines of some 50, 80, or 90 foote, as the ground will afford, and the diuisions betweene Regiment and Regiment.

Afterwards he marketh vpon a paper, euery one of the said quarters, and Regiments a part, according to the proportion of the same scale, as one hath drawne the lines aboue said, and then cut it of soe that they haue all one depth of 300 foote, and the bredth according to the list of the number of the Companies of euery Regiment, and how many foote euery Regiment and quarter will take up. It were better to take a peece of past board paper & then make & cut out also vpon the said paper, the depth the bredth, and the name of the regiment the Colonell and person to whome the quarter belongs; doing the like in all the other quarters. These litle papers being so cut and ordered, one may put and lay them again vpon the paper with the *parallell* lines aboue said, euen till they be laid according to your desire, and let them be as they are fitted. One must nevertheless have a care, that the Generals quarters be in the middest, and that there bee a conuenient space without his quarter, as well before, as on both sides, as the figure following will shewe marked with the letter A, where the Generall is lodged in the midst of the Campe, and the bredth of his quarter, according to this scale is 1250 foote, and the depth as is said 300.

The quarters are separated one from an other by streetes, and diuisions some lesse some more, as the ground will giue it, as somewils 50, therwhils 80, 92, or 100 foote betweene quarter and quarter, as you may see in the figure following.

Finally the *Quartermaster Generall* takes first the bredth and depth of the whole quarter, and Campe, and drawes it ougth (as is taught) vpon a paper. The bredth here takes up 3000 foote and the depth 2000.

The draught of the campe being drawne vpon a paper, and the whole quarter designed, it will be easie then to lay them out in the field.

*How one must marke and lay  
out the quarters in a field.*

To this end, the *Quartermaster Generall* hath a chaine divided into *Rhyn-Landish* foote & Rodds at 12 foot the rodd, & an instrument vsed in fortification, or at least a wodden crosse with foure right angles, and a good number of Beacons with banroles vpon them, called *quarter beacons*, whereof the staues are painted, and are some nine, or ten foote long, and sets vp one of these beacons vpon the angles of every quarter.

Being come into the field, in which he is resolu'd to encampe the Army, first he layes out the circuit of the Generall quarter, with foure exteriour lines in such sort, that every corner of the quarter makes a right angle.

After one hath measured out the foure lines aboue said, he sets vp foure quarter Beacons, and then begins to lay out euery quarter a part, according to the proportion, which he hath marked in this paper: but to the end one may not err, he puts vpon the little cut paper the number of euery quarter, with which also the Beacons are marked, by which meanes the same quarter is bounded in the field, and the number is painted, or cut vpon the Beacons. It will not be amisse, to haue alwayes foure of them of one number, which may easely be known by the Beacons, in case they were all of one coulour. All which is demonstrated in the figure of a Campe where the Beacons are set up, and noted with the figures 1, 2, 3, & 4.

*The*



*The duty of a Quartermaster of a Regiment.*

**A**fter all this is done, and euery particular quarter drawne out in the feild, euery quartermaster distributes the ground to the Companies of his Regiment, according to the *Ichnographie* of the figure of 10 Companies showne before for a regiment; In laying out of his quarter, he vseth a line of 300 foote long and euery eight foote is marked for the depth, and bredth of the huts and streets, sticking downe into the ground at euery eighth foote a bough, or stick, aswell in the front as in the reere of the quarter, giuing also to the Colonell his ground in the midst of his regiment. But first the quartermasters prikes out the ground before and behinde for the Captaines, & giues there the bredth of the streete betweene the Sarjants in the reere of the souldiers huts, and their owne as likewise the depth, betweene the Captaines boughs the Sutlers huts, marking out first the foure angles of his quarter, by setting into the ground his quarter staues and flaggs of his Colonels colours.

*The duty of a Sarjant.*

**T**he quarter being so laid out, then the Sarjant of euery Companie kilspits it, and diuides and makes the partition of the huts to the Gentlemen and souldiers, which they prick out by line and small boughs, or sticks stock into the ground, and so diuides the rowes of huts and the streets among them, euery hut hauing some 4 or 5 foote in bredth, and for vniformity sake 8 foote deepe, and thus the ground for a whole Regiment of what number soeuer the Companies be, is marked and drawne out in a feild, as the figure of a Regiment for 10 Companies before mentioned demonstrates.

The other quarters to wit, for horse, officers, ordinance, and carriages are marked by number and letter in the Campe following.

*The Alarme place.*

**T**here is left round about the circuit of the whole quarter, a *parallell* on all sides some 200, or 250 foote betweene the front of the quarter and the trench, called an *Alarme Place*, for the souldiers to draw out into Armes, into *Parade*, or when any *Alarme* or commotion happens, the *Campe* or quarter being enuironned with a Trench, and a Parapet of six foote high, six foote deepe and three foote in the bottome, and the ditch 8 foote broad.

The souldiers of euery Companie are commonly commanded to make this trench, parapet, and ditch before their quarter, or where it may fall out, because it serues for their own defence, which the souldiers are to doe, for their owne safety, without giuing them any mony for it.

There is assigned by the quartermasters to euery Regiment, how much ground they must *cast vp*, according to the commission and strength of euery company, which proportionally is equally diuided among the companies, that one companie do no more work then another. In doing of which, the Captaine and officers of a companie are to ouersee it, that the trench be done well and with expedition. Now the whole circumference of the quarter, being measured out by line, and *kilspitted*, there is a generall *calculation* made, how many Regiments there are in the Campe, and how many companies each Regiment hath, that one may know how many hundred companies there are in the army. And then by the rule of 3 (knowing the line and circumference) and the number of companies, say, the number of all the Regiments, and compaignies which are to make up the line of *Circumvallation*, amounts to so many feete, or rodes, how much ground then must a Regiment of ten companies haue that contains so many men. This *calculation* being made, the companies of euery Regiment draw out so many men, after the quartermaster hath furnished them with materials, which is quickly done, seing the men are relieued, and many hands (as the proverbe is) makes light worke, and will make hast, that they may haue time to build their own huts and cabins to keepe them vnder covert.

The quarters being thus fortified, and the line of *Circumvallation* made a double ditch for horses and strong *Redoubts*, *Horne-works*, *Crowne-works*, *Batteries*, *Half-moones* and

Spurs upon the commanding places of most danger (as your shall see in the *Ichnographies* of the lines of Circumvallation before the siege of the *Bosch*, *Mastrick* and *Breda* which shall be shown (God willing) in my third part of this booke; all these things then being done, after the demonstration of this Campe, we come next to handle approches.

### THE DEMONSTRATION OF THE severall Quarters in this Campe.

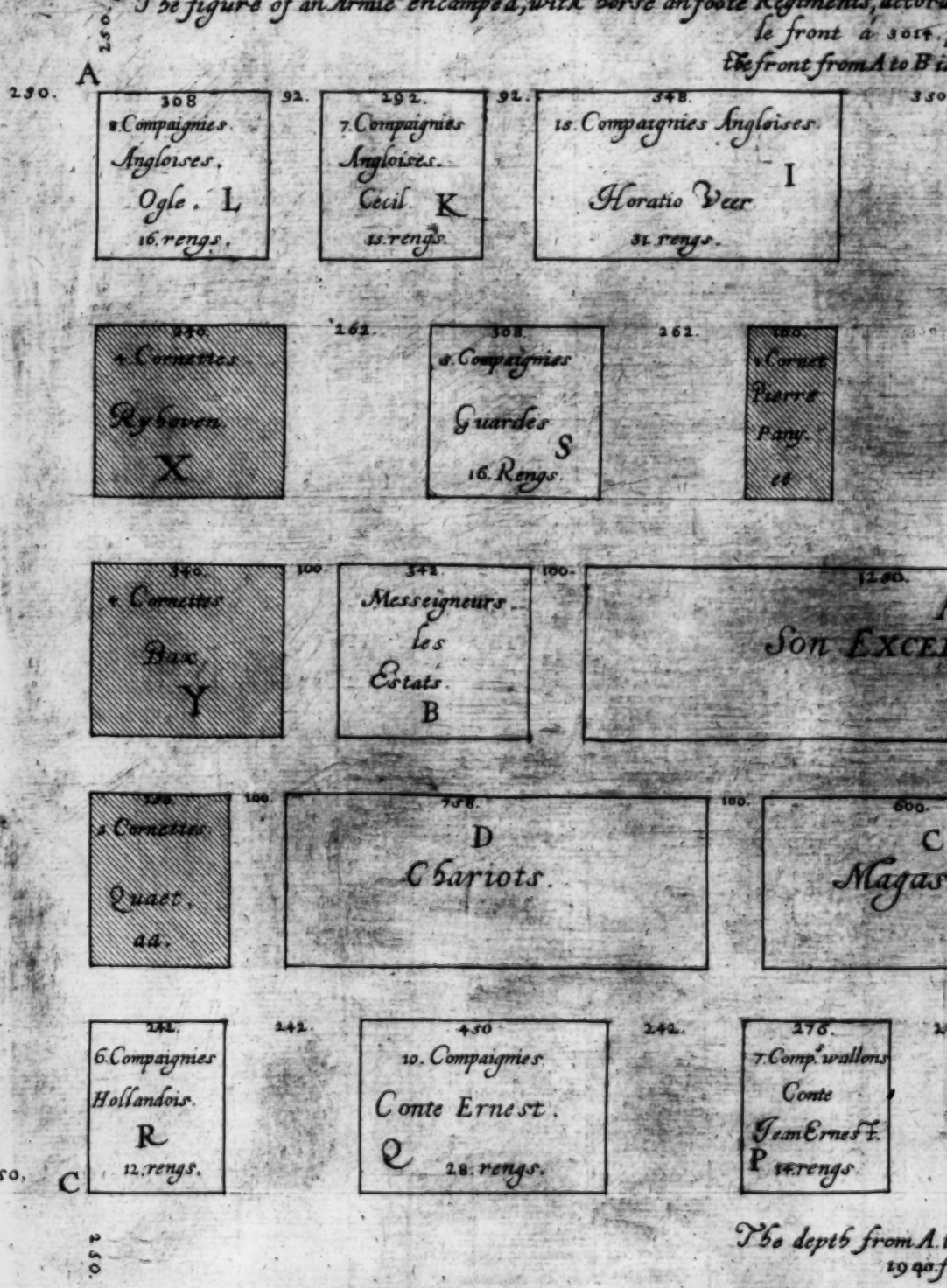
- A* is his Excellencies quarter, which is 300 foote in depth and 1250 in bredth.  
*B* is the Lords the States quarter being 300 foote in depth and 342 in bredth.  
*C* the Generall of the ordinance and Magazin 300 foote in depth and 600 in bredth.  
*D* the quarter of the Carriages and waggons.  
*E* the quarter for marchants, tradesmen and vicillars.  
*F* Mons. Chastillon quarter being 14 Companies making 28 Rowes of huts 300 deepe and 500 foote broad.  
*G* Mons. Bythanes being 13 Comp. making 28 Rowes 300 foote deepe and 500 in bredth.  
*H* the Freezes being 13 Comp. making 13 Rowes 300 foote deepe and 335 foote broad.  
*I* Sir Horace Vere's Regiment being 14 English Comp. making 31 Rowes 300 foote deepe and 548 broad.  
*K* Mons. Cicils Reg. being 7 Comp. making 15 Rowes 300 foote deepe and 292 broad.  
*L* Colonel Ogles Reg. being 8 Comp. making 16 Rowes 300 foote deepe and 308 broad.  
*M* Mons. Fulchs being 6 Comp. 18 rowes 300 foote deep and 340 broad.  
*N* My Lord of Bach-louch being 6 Comp. 12 rowes 300 foote deepe and 244 broad.  
*O* Colonel Egmont his Reg. being 6 Comp. 12 rowes 300 foote deep and 244 broad.  
*P* 7 Comp. Wallons commanded by Count John Ernest 14 rowes 300 foote deepe and 276 broad.  
*Q* Count Ernest Lord Marshall 10 Comp. 25 rowes 300 foote deep and 450 foote broad.  
*R* 6 Comp. of Hollanders 12 rowes 300 foote deep and 242 broad.  
*T* Prince Henry Generall of the horse 4 Cornets 300 foote deep and 476 broad.  
*V* Capt. Dwitch 3 Cornets 300 foote deepe and 250 broad.  
*W* Mons. Marquet Lieut. Generall 4 Cornets 300 foote deep and 340 broad.  
*X* Mons. Ryhoven 4 Cornets 300 foote deep and 340 broad.  
*Y* Mons. Bax 4 Cornets 300 foote deep and 340 broad.  
*Z* Mons. Waghaman 3 Cornets 300 foote deepe and 250 broad.  
*aa* Mons. Quael 3 Cornets 300 foote deep and 350 broad.  
*bb* Mons. Sals 4 Cornets 300 foote deep and 340 broad.  
*cc* Mons. Stakenbrouk 4 Cornets 300 foote deepe and 340 broad.  
*dd* The Droft Sallant 4 Cornets 300 foote deep and 340 broad.  
*ee* Peter Pany commanding the Princes guard of horse 1 Corn. 300 foote deep and 100 broad.

OF



# Figure d'une Armée en Campagne, avecques sa Caur

The figure of an Armie encamp'd, with Horse on foote Regiments, according to the front from A to B is

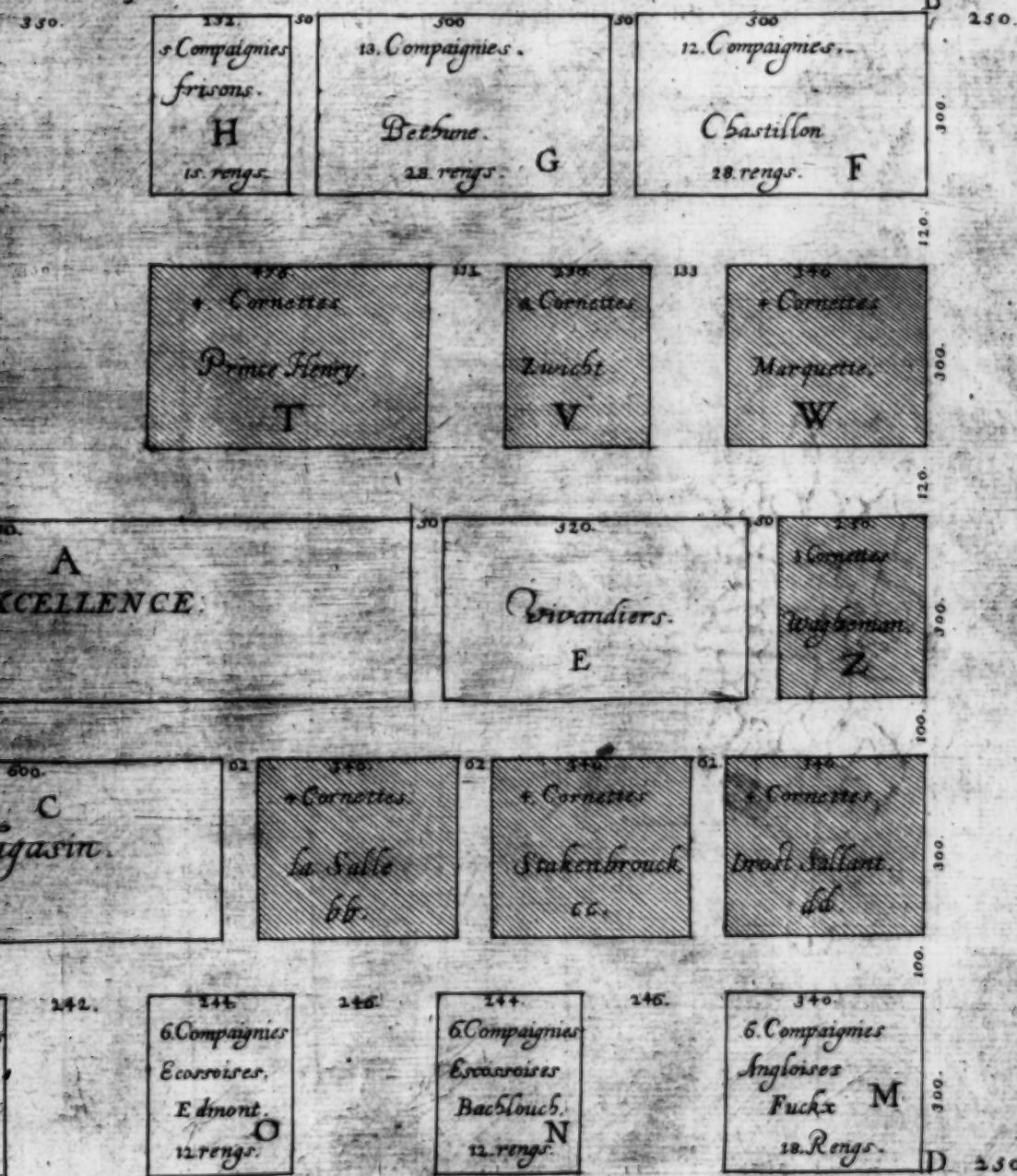




*Cavallerie et Infanterie, selon l'Ordre du feu Prince d'Orange,*  
*according to Prince Maurice his order, of famous memorie.*

1014. pieds de long.

to B is 3014. fote.



from A. to C. & from B. to D. is  
 1940. fote.

1000.

2000. piede.

OF ALL MANNER OF APPROACHES, AND  
their Profiles, with the definition what approaches are.

THE FIFTH CHAPTER.

**T**He Approach by which one approacheth safest towards a Towne, or a Fortresse besieged, are certaine hollow ditches, called *Trenches* digged into the Earth, whereby one may approach neare vnto a Towne, or a fortresse covertly, without any great harme, if the lines be carryed well, and kept from the sight of an enemy.

In approaching one ought to consider well; 1 *The situation of the Towne or fort to be besieged.* 2 *The propriety and forme of the approach.* 3 *The beginning and distance of them, and fourthly their profile.*

1 For the Site of the place, one ought to consider well the propriety, and nature thereof, whether the ground bee high, low, hilly, or plaine. In plaine and even ground, one may finde foure kinds of Earth, to wit, 1 a Clayie and a solid Earth, 2 Sandie, 3 a Spongie and rotten earth, & 4 moorish and a marchie ground which may bee covered and lie vnder water, hauing no firme foundation to work vpon. Secondly, hilly places whether they have a solid foundation, 3 Sandie, and 4 Stonie. Also one must take into consideration, the Forts, woods, wayes, ditches, hills, and such like things, as may lye round about it, or go towards it.

*Of foure manner of Approches.*

**F**irst, if one cannot make choise of such ground, as they desire, then one must take it as it falls out, whence there follows diuerse manner of Approches; for, if it be good ground, then they run their lines directly from the left hand to the right, and from the right hand to the left, continuing it *alternatively* till you come to your distance desired, the half of which trench is digged into the Earth, and the other halfe cast up with a *parapet* raised vpon it, which serues as a blinde to keep your men from the sight of an enemy, and thus you continue your approach by windings and turnings, till you come to the *Counterscarpe*, and moate of the Towne besieged, and this kinde of approach you vse in good and firme Earth.

The second kinde of Approach is that, which is made in a *Sandie ground*, which you may run in the same manner with windings, and turnings as you did the first, saving that your *parapet* will not hold with sand, and therefore, because Sand is not so good to work upon, and will not lie so firme as other Earth doth; but will cost more labour, and require more time then solid Earth, therefore one must approach neerer and neerer by setting vp of *Gabions*.

The third way hath another difference, then these two abouementioned, for sometimes one may finde good Earth, and Sandie mingled together, yea, and somewhiles a *Marras* on both sides, in so much that one shall haue but a narrow way, through which one is to carry his approach, and as in the former you cannot run your lines from the left hand to the right, or from the right hand to the left, so in this you are driuen to run a line directly vpon the Towne or Fortresse besieged.

Now this manner of approach carried in a right line, is not so labourfome and chargeable as the others before-named, which are run with *oblique lines*: but the greatest labour is, such an Approach must be made deeper, then the former, & do require a double trench and *parapet*, whereas the others haue but a single one, and euer and anon there must be blinds set vp because this kinde is more dangerous, and in this approach the one half of the Earth is set up with a parapet on the one side, and the other half on the other side.

The Approach which is made through moorish, and marchie grounds ouerflowne, is almost impossible, by reason of the inconstancie of the water, which riseth, and falleth according to the season, and which causeth many inconueniences: for when one expects dry



season, the weather may alter and proue raïne and stormie, which may not onely hinder the approach begun, but also fill the trenches with water, therefore in such cases, one must accommodate themselves, according to the weather, and vse the wiledome, and experience of Ingeniars herein, for the preuenting of these inconveniences.

As the half of an ordinarie approach, is digged into the ground, so the other half is cast vpon ground: this kinde being made over water and *Murres*, having no firme foundation, the foundation of them is layd by filling vp the water with bundles of Boughs, Brush, faggots, and such like things, having Earth cast upon them, to settle them, and make them lie fast, and the Earth being brought upon wheelebarrowes from some other place, a *parapet* is raised, and blinds sett up, that the workemen, and souldiers may work and be in more safety, which guards it.

The fourth difference of approach, is also made by Earth brought from some other places, having *Fagots*, *Brush*, *Bavins*, and planches layd vpon it, with *parapets* and blinds sett vp.

Fifthly, having want of good Earth, and finding great store of Sand, then the parapet must be made with *Gabions*, and Cannon Baskets filled with Earth.

The sixth & last manner taketh its originall from the former, and is made with Redoubts in joyning the one to the other.

And if your meete with a stonie place, then you must help your self with *Gabions*, & fetch your Earth from some other place, as you did in marchie grounds.

These are all the severall kindes of Approches, that we have mentioned here in this Chapter, which one cannot make without difference & judgement, because the one is more laborious, and dangerous then the other, as we have taught.

But to the end all inconveniences may be avoided, one must first informe himself well of the nature of the place, through which one is resolved to run an approach, and take a speciall care, that no error and faults be committed through ignorance, which may loose time expence and labour, and may crosse the happy successe of an Armie, for it were an absurd thing, if one should make that approach in a moorish ground, which is to bee made in a plaine place, where there is good Earth, where one hath elbow room, and space enough to run oblique lines, or when one would make them above the ground, when there is Earth enough to be digged out of the ground and cast vp.

Besides, one ought to consider well, the distance of the first breaking of ground, between it and the Towne or Fortresse to be approached to, that one begins not too neere, nor too farre off, for the beginning of the Approches being too farre from the Fortresse, one looses both time and paines, when one begins to breake ground from a place which is in safety.

On the other side, to begin an approach within the sight of an Ennemie, one cannot so well defende himself from musket shott, because the Muskettiers may take a surer marke, then when they shoot at *Randum*, and it will be hott for the workmen, before they can gett into the ground, besides the workemen cannot be so well seconded, and relieved without great danger, especially if the besieged fallies out, and gives them hott *Alarmes*, so that they must be presently, relieved, or else they will be driuen to quit the approaches and to retire, if they be not seconded betimes.

*The distances betweene the beginning of an Approach, and a Fortresse.*

Hence one may clearely vnderstand, the distance of the Approach to the Towne or Fortresse besieged, and the place where one begins to breake ground first, ought to be as farre, as a musket can well carry from the outworks of the Fortresse, which may be about some 90, 80, 70, or 60 rod at 12 foote the rodd, or as the nature of the place will afoard it.

*The*



*The beginning of an Approach.  
or first breaking of Ground.*

When one would begin an Approach, there must be choise made of 200, 300, 400, or 500 lusty souldiers, which are vsed to work, now besides the ordinaires armes, which they carrie, they take downe along with them into the approches spades, shovells, pickaxes, and others materials necessary for work, and are set in order by the Ingenier in that place, where the Approach begins, and to the end they may begin with the more safety, they have diuerse guards of Foote, and horse standing up and down, here and there to defend them, if the besieged should fall out vpon the Workemen, and because they may make a good beginning, first they cast up a Redoubt or two, from whence the trench & approach is run, which are environned with a parapet, & a good ditch, and the sides of the redouts made some eight rods square, as you may see in the profile of trenches.

Indeed, sometimes as occasion may serue, they make *demj Bulwarkes*, or it may bee *Whole Bulwarkes*, for which one takes a *Profile* answerable to the greatnesse, for when they are little, one makes vse onely of the *Profile* of ordinaire trenches, and when they are great their *Profile* must be likewise correspondent vnto them.

These workes and Redouts serue for a Retreat to the Workemen, if an Enemy should make a great fallie vpon them: for being retreated into the said Redouts, they may resist an Enemy, and stopp them, till they are seconded, so that such Redouts are very necessary. For if the workemen had not a place to retreat into, they would be forced to betake themselves to their heeles, and to abandon and loose their worke.

But the Ingeniers which are employed therein, ought to vse all the skill, industrie, and experience they have to run their lines in such a fort, that those which are in the trenches and approches may not be discovered and seen by an enemy. In a word, they may runne their approches with the more safety, and as much expedition as possible bee towards the place, or part of the Fortresse, which the Generall desires to become master off.

There are two principall parts in a Town or Fortrefs, one of which must be battered, if one is resolved to take it in, and that is, either a *Curtaine*, or a *Bulwarke*.

*What part of a Fortresse ought to be approached to.*

It is not good to approach to a *Curtaine*, which is defended by the two next Bulwarkes, and their flankes, when you are to expect an enemies Canon continually on both sides of you, especially, when you would give an assault vpon it; for afterward it may easily be cut off. Besides that the moate is broader before the Curtaine, then in other places, whence it followeth manifestly, that there is no advantage in approaching vpon such a place.

But a *Bulwarke* is the safest, and best to be approached to and taken in: my reasons are these, first the moate is not so broad and large, as it is before the Curtaine, and a Bulwarke hath but a single defence, coming from the Bulwarke opposite to it, which may be better beaten upon by Batteries then the Curtaine can. Moreover, a Bulwarke hath but a little defence of it self, because on may be forced to retire from it, and to make new workes, and cuttings of behinde that part which is quitted. And because there is no so much space, as is within the curtaine, the fortification thereof is more painefull and more incommodious, and therefore it is better to approach towards Bulwarkes, then curtaines, which is found by practise, and daily experience.

There are other workes belonging to a Town, or Fortresse, as (*Crown-workes*, *Horn-workes*, *Tenailles*, *Ravelings*, *Halfe-moones*, and others. The manner of carrying of approches wil be cleare and easie enough, when wee come to shew an approach by figure vpon a Towne or Fortresse which is to be taken in.

After one hath maturely resolved, whether he will run an Approach vpon a Curtaine, or a Bulwarke. The Ingenier being present at the breaking of the ground, is to shew & informe the workemen well, how they are to run their line, and as necessity requires, being of diuerse lengths, but most commonly some 20, or 40 rod long, or sometimes shorter or longer,

and broken and turned as often as is necessary. The line then being laid out and marked they divide and place the Workemen in order, that they may not hinder one another.

Now they giue to euery man the length of foure or fīue foote, and every one maketh as much hast as possible may bee, to gett into the ground, for the avoyding of the danger whereunto he is exposed, while he stands vpon the open feild, therefore the Earth which he diggeth he casteth it vp before him, and with all expedition maketh a hole like a graue: it is needlesse that at the first breaking, the ditch should be any broader or deeper then three foot, for the Earth being cast vp three foote aboue the Ground, and the ditch likewise three foote deepe, a man then hath covert enough.

The Workemen then being got into the Ground, they enlarge and deepen the Approches as necessity requires, but those which are fardest of from the Towne, they need not be so deepe at the beginning, as when they come neerer to the Fortresse. The bredth of the Approches ought to be some 10 or 12 foote broad, as may be found necessarie: yea, sometimes one is constrained to make them larger, least they might be too narrow, in regard waggons may be driven through them with materials necessarie for the Gallerie, as also Canon which must be drawne downe, and mounted vpon the Batteries.

But by how much larger the Approches are made, by so much ought the parapet of the Trench to be heightned, that the Enemie may not discover the Souldiers that are in them.

Especially one ought to heighten those points, and windings, where the Line turnes, otherwise it may proue very hurtfull and dangerous.

While the Souldiers are busied in makeing of the Line, others are employed in making of a Batterie, to hinder the Enemie from Sallying out.

When the night is past, there are fresh workemen sent downe to relieue the first, and to enlarge, heighten and reparaire that nights worke, vnlesse some of them are willing to continue their worke, and these commanded men, are to haue ten stivers a peece, which the Quartermaster of every Regiment, who delivers the materials doth solícite for and payes them.

After the first nights worke (or it may be the same) there are *Corps de guard* made, to putt a good number of Souldiers into, where they keepe their *Maine guard*, which are made sometimes within the lines, with which the *Corps de guard* ought to be *Parallels*, or else vpon the point where the line turnes, and sometimes without the Approches, to which the *Corps of guard* are ioyned to them by a line of *Communication*: so that they lie three or 4 Rod from them.

It is not alwaies needfull that these Redoubts be made square, but one may make them *long-wise*, or else with 5 *Angles*, and after diuerse other manners, as the Ground will best afford.

Most commonly one workes by night, that they may receiue the lesse harme, and that the day following the worke may be repaired.

When one line is finished as abouesaid, and that it must be run no further that way, the *Inginier* turnes the line another way, (bearing it from the Towne or Fortresse) and placeth the Workemen in order as abouesaid, in continuing so by windings, and turnings, till he hath gott something neere vnto the Fortresse befeiged, and makeing good the Line continually with *Corps de guards* and Batteries.

But the neerer they approach vnto the Fortresse, the more subiect they are to danger, so that their pay is encreased every day, as the Approach is advanced, seing they hazard their liues for it, they haue a halfe Rixdaller a night, sometimes a whole Rixdaller other-whiles a Rixdaller and a halfe, yea sometimes ten Rixdallers for an howers worke, if it be very dangerous.

Finally when you are approached with your trench so farre that you are continually in the sight of an Enemy, and where you cannot get any more ground, but with great danger, they make vse then with an other manner of digging, or an Approach called commonly a *Sapp*, which is made in this manner following.

When a resolution is taken, to approach vnto a *Curtaine*, or a *Bulwarke*, you run a right line



line vpon that place, which you intend to assault: as for example, suppose it were vpon the Demiface of a Bulwark; in such sort, that it lies without the flanking blowes of the Fortresse.

A man then kneeling vpon his knees, diggs to get into the Ground and casts vp the Earth before him on both sides, with a short spade towards that part of the Fortresse, till he hath digged three foote into the Ground, and that hee is covered with the Earth, casting alwaies the Earth like a moald before him towards the Towne, and on that side, where the most danger lies, he ought to cast vp the Earth so high that it may be able to shelter those, which comes to repaire and make the Sapp larger. After the first man which makes the Sapp is got into the ground and covered with earth, he advanceth forward and continues the Sapp, till he hath got some six foot, and then follows another Sapper presently, who repaires and enlargeth the ditch to the bredth of six foote, while the other advances forward three foote further in bredth, and got so deep, that he is alwayes covered with the Earth, which he casts vp before him, and the other follows him continually enlarging the ditch from three foot to sixe. After him comes a third man, which finishes the whole Sapp, and gives it the convenient height, depth, and bredth answerable to the first approach. But one must have a singular care, that the approches and Sappes bee not digged so deepe, as that water may rise in them, but that they may alwayes remain dry vpon firme ground, which the condition of the ditch wil shew it: For when the water within is very deep, and the declination high enough, one may make the Approches as deepe as the ditch, when the water that is in it, is distant from the plaine Earth.

Touching the manner of Working, an Agreement is made with certaine workemen, because a greater number of workemen cannot worke in so narrow a passage, they take on five or six workemen, and give them 4, 5, 6, yea sometimes more rixdallers apeece, as they can agree with them, and as the danger is little, or great.

In this manner of work, being come so neere for the safeguard of the Muskettiers, which are to giue fire, there are *musket baskets* set vp vpon the top of the *parapet* of the approches, close one to another filled with Sand or Earth, between which the Muskettiers puts out the noses of their muskets to giue fire vpon the besieged.

And because the approches, the neerer you come to the Fortresse are made much deeper then at the first breaking of ground, there are one or two *spote banks* made for the souldiers to mount vp vpon, and to discharge their muskets or firelocks.

As for example, the figure following numbred 153, is the part of a Towne or Fortresse vpon which wee are to run our approches, and that vpon firme and good ground.

*The First Example.*

For as much as the Fortresse is environed with a *Corridor* or a *Counterscharfe*, one must not take the distance from the great *Rampart*, but from the *Counterscharfe*, and begin the approches some 90 rods distance from the *Corridor*, because one may with the more safety put the spade into the Earth. Therefore one beginneth the first line of approach from the letter *A*, and runs it to the letter *B*, being some 30 rods long or thereabouts. The beginning of the line is fortified with a *Redoubt* marked with the letter *C*, into which the workemen (if the besieged should fall out) may make their retreat, and into which also the guards for the workmen may retire. The first line turneth at *B*, taking its beginning neere vnto the *Corps de guard* *D*, and runs to *E*, being some 30 Rodds in length, where another *Redoubt* is made marked with the letter *F*, to hold a guard in it, and because it might be dangerous to run this line any further, it turneth from *F* to *G*, and from *G* to *H*, where another *Corps de guard* is made. For the neerer you approach unto the Fortresse, the more the approches must be strengthened with guards and batteries. Besides the approches there ought to be made deeper, and higher, because you come neerer the Enemies, Canon, and his Musket shott, which may shoot the surer vpon you, here then you begin to set up musket baskets, and make foot-banks to your approches, that the souldiers may gett vp to them when they are commanded to giue fire.

(E)

When



When one is approached so neere by meanes of these turnings and traverſes that the remainder may be run with a long *Traverſe*, then one begins to Sapp from *H* to *I*, from which alſo one may make another line to approach unto the other ſide of the ſame Bulwarke, or alſo the other Bulwarke, as the line from *I* to *K*, ſhews. Behinde theſe lines the muſkettiers gets up allwaies to diſcover, and ſhoot at thoſe that would peepe into them.

There are likewiſe two Redoubts made on both ſides for guards, as the letters *N* and *O*, do ſhow.

In the *Interim* a Sapp is begun, that runneth towards the Bulwark, which one is reſolved to mine in, and which is made in the ſame manner, as we have deſcribed above, when you ſap into the *Counterscarpe*, and that you are come to the brinke of the *Moate*, then you are to fill and damme it vp, and to make a gallerie, and blinds which we will treat off when wee come to ſpeak of a Gallerie.

While you are buſied about making your approaches, diuerſe batteries are made here and there, which ſerve partly to ſpoile the Ramparts, and partly to diſmount, and hinder the Enemies Canon from playing upon you, and to keepe the beſieged in awe, that the workmen may worke with the more ſafety, as you ſee by theſe ſixe batteries noted in the figure 153, and thus much for approaches vpon good ground.

Wee have divided the approaches, which run in a right line into three ſorts. The firſt is in a narrow way, an Earth which may be ſpitted out ſomewhat deepe, and yet nevertheleſſe without turnings and *Traverſes*. The other is when you cannot digge into the Earth, but there is, or you ſhall have water preſently, as hapneth in low and mooriſh grounds.

*The Second Example.*

When you are to approach vnto a *Fortreſſe* in a right line, and that the nature of the way through which you are to carrie your approaches, is of ſuch a condition, that you cannot digge into the Earth with ſpades, then you muſt do as is ſhowne in the figure 154, where they are covered with Earth both on ſides, & are made a litle deeper then ordinary Approches. Now ſeeing the danger is greater in this kind, then in the firſt, and that a right line cauſeth you to be continually in the ſight of an Enemy, you muſt prevent, and avoid that danger by making of blinds, which are either made of bundles of riſe, or brush, or with thick oaken planckes foure or five ynches thick, and as in this figure you may ſee, for what uſe they ſerve.

*The third example.*

There where one cannot digge, as in Marras and mooriſh places, a foundation muſt be made with ſinkers, that is bundles of boughs bound faſt together, vpon which (as is ſaid) Earth is caſt. Vpon this foundation one makes *Traverſes* and *Blinds* with *Gabions* as you may ſee in the figure 155.

Theſe *Gabions* are alſo filled with Earth and made ſo ſtrong, that they are Canon prooſe, one may ſett vp alſo a double row of *Gabions*, which ſometimes haue Earth caſt about them.

The bredth of ſuch approaches is from 4 to 8 Rods, as the place is narrow or broad, and as neceſſity and danger requires, but the Ordinarie bredth is noe more but foure or ſiue Rods. One muſt haue alſo a care, that one *Traverſe* endeth there where an other beginneth, to wit, there where an alley is left.

The like manner of Approches were made at the ſiege of the *Beſchion Count Erneſt* his ſide, to which as being a new found worke, it got a new name, and was called the *Grease Gallerie*.

This manner of Approach may be vſed alſo in a ſtonie ground, where one cannot digge the Earth becauſe of ſtones.

fig. 153.

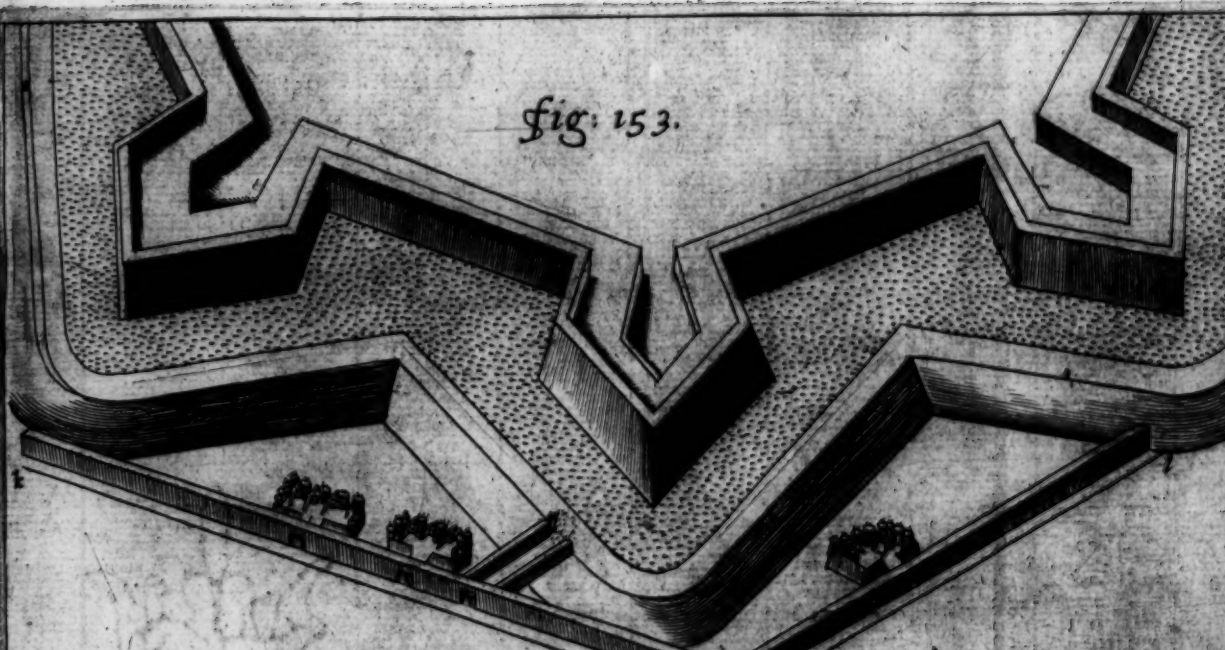
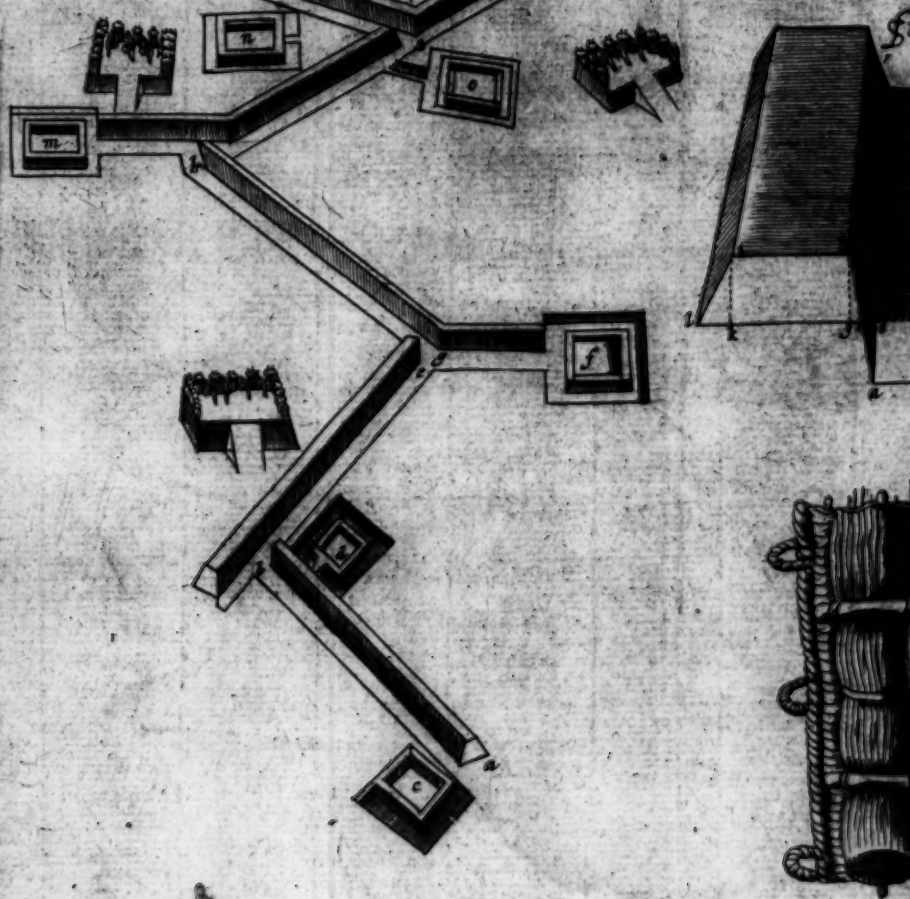
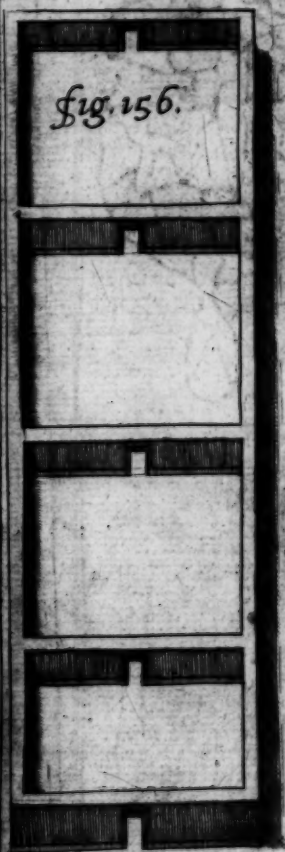
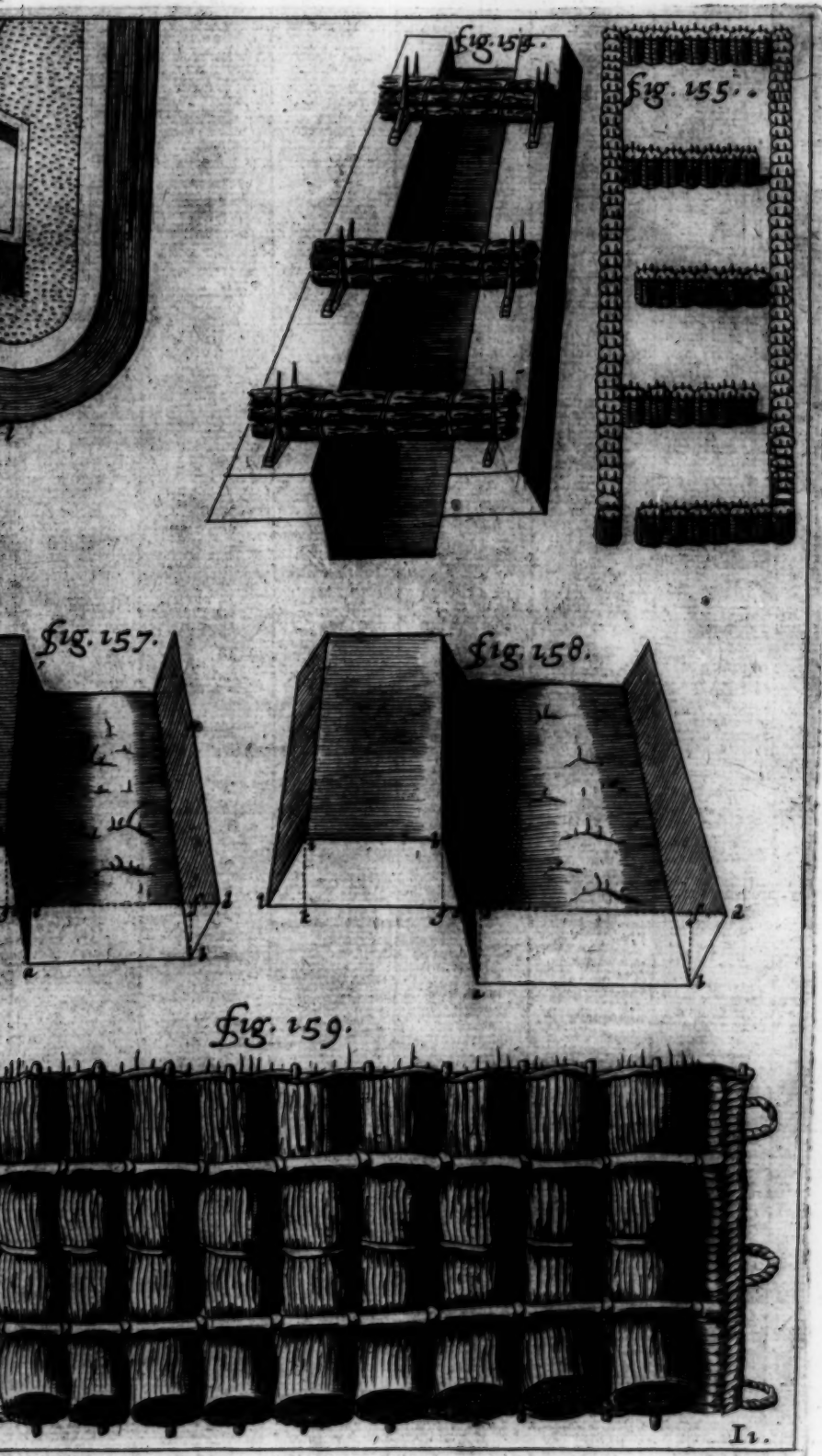


fig. 156.







The fourth Example.

Again you meete sometimes with a foundation, which one cannot passe through dryshod, and cannot get deepe enough into the Earth, but one is forced to approach in that manner as is represented in the figure 156 in taking the neereft way, which may be to approach unto the Fortresse, and the Approches is made of that Earth, which is digged about it, in stead of setting vp of Gabions, And as in the former Approches the traverses, and blinds were made of Gabions, so here they are made with whole Redoubts: in the midst whereof there is a gape or a Sallie, made in such sort, that the one Redoubt is ioyned to the other, the greatnesse of every Redoubt, being some six or eight Foote in length, and as much in bredth.

Such Traverses are oftentimes made so strong, that they are able to resist a Canon-bullett when they have Earth enough, for sometimes they are made sixe foote, but the height of of them is not alwayes alike, seing they must bee made higher there, where most danger is.

The gates are made in such sort with a falling plancke, that they may bee drawne vp, and shut, and are of that height, and bredth, that a waggon may come through them.

It is a thing impossible to describe all the maner of Approches, because they are so mixed and of such great diversity.

Neither is the ordinary way of approaches alwayes a like, because the one are made deeper, and larger then an other: but commonly they are from 8 to 14 foote broad, and three or 4 foote deepe in the Earth, or their therabouts: the Basis of the Earth layd upon it, in stead of a parapet, ought to be betweene seven and eight foote.

Wee have propounded as an example for them two Profiles, marked with the numbers 157, and 158, whereof the greatnesse, & measure of them, is noted with letters and numbers in this table following:

THE DEMONSTRATION.

FIGURE.

The Profile of the figure marked.	157	158
The inferiour bredth of the Approach.	AB	12
The depth of the Approches.	EB, EA	4
The Talud or Sloping exterior.	ED,	2
The Talud inferiour of the approaches.	CE,	2
The Bredth of the Approches above the Earth.	CD,	11
The Basis of the Parapet above the Earth.	LC,	10
The Talud exterior of the parapet.	KL,	2
The Talud interior of the parapet.	GC,	2
The height exterior and interior of the parapet.	IK, GH	4
The Top of the parapet.	HI,	7

We have expressly omitted the foot-banks, because they are not made in the beginning of the Approches; which ought to bee made in the Approches after diverser manners sometimes this way, and sometimes many as occasion may serve.

COVN.

(E) 2

## OF COUNTER-APPROCHES.

## THE SIXTH CHAPTER.

**T**He *Beseigers* having approached neere unto a Towne or a Fort, it behoves then the beseiged to look well about them, and not to be idle, but stirring, and to doe their utmost endeavour to hinder, and offend their Enemy.

The defence which is made against these Approches is rightly called *Counter Approches*.

This defence also is made after diverse manners, first when the Beseiged are a great number, so that oftentimes they are able to fall out, and make Sallies, which they ought to do as often as may be, notwithstanding that they loose men, which of necessity must happen, because the Beseigers are much more stronger then the Beseiged, and have farre more forces, then those which are within the Fortresse.

For by this meanes the Enemy will be hindred, and his Approches slowly advanced, being many times beaten back, and constrained to retire into his workes, during which *Alarme*, they cannot advance forward their workes, neither can they begin them againe, till the Beseiged are retreated.

They ought to have a singular care, when one makes a Sally, that their men be not exposed to slaughter, but must be commanded to fall on with discretion, advantage, and profit, to the end that the Towne or Fort beseiged be not bereft of their men by foole-hardinesse, rashnesse, and imprudencie.

For a Fortresse which wants men, may bee compared to an empty purse which hath no money in it. It lies much vpon the endeavour of the Horse, which are in Fortresses, for making of Sallies, and which ought to fall out oftner then the Foote, because they can fall on and retreat with more speede, and though some be lost, yet the hurt will not be so great, as the losse of foote, which must be husbanded, and spared as much as possible may be, to repulse the assault of an Enemy.

The second manner of defence is made by *Canon*, which must play continually from all places vpon the workemen and approches, to doe them as much harme as possible may be, whence it comes to passe, that the Workmen are amazed and frightened, when they see many of their fellow workemen fall and slaine miserably by the Canon, which will abate their courage, and make them worke more faintly: in such sort, that an Enemy is driven to leaue of their worke, till such time as the offensive side have made Batteries, against the Beseiged.

But when it is not feisible, they must be constrained at last to breake vp, and quit the seige, otherwise if they continue, it will be exceeding chargeable to them, because no men will undertake the work, but such as will be soundly payed for it.

For every man hazards his life, when Ordinance and Musketteers play continually vpon him, and a man will not venter his life for nothing, but will sell it at as deare a rate as he can: besides in so doing, it prolongs the time for an Enemy, so that a Fortresse may sometimes be relieved, or when Winter, or bad weather comes on, they may be forced to abandon the Siege.

The third manner is by making of all sorts of *Outworkes*, and in taking vp the Ground, whereunto an Enemy Approches, which may be made during the seige, and while an Enemy approaches, as by making of *Ranelines*, *Halfe-moones*, *Horne-workes*, *Tenailles*, and *Traverses*: for all these workes may be made, while an Enemy advances his Approches towards a Towne or Fortresse, but it were better they had bin made before the Towne was beseiged, for the gaining of time, and saving of charges, which might be employed in other workes.

The fourth maner is when the Beseiged make Counter Approches, whereby they may resist an Enemy that he may not get into the Outworkes and *Counterscharfe* with his approches, where to hinder him, they must cast vp some *Traverses*, and other lines running them from



from their outworks, as it were to meete the Enemies works, and so make them get ground (as it were bypeece meale) till they come to the Fortresse: But neverthelesse one must observe well, that they must be carried and made so, that they may alwayes flanke vpon the *Besiegers* workes, and approches, and that the *Approches* may do them as little harme as as may be, alwayes making them so, that they lie open towards the Town, or Fort besieged, from whence they are to be defended, and must be so carried, that they may giue no advantage to an Enemy, when he takes them in, and see that they may be flanked from the Town and Fort both with Canon and musket.

At the last siege of *Bergen vpon Zoome*, there were many such *Counter-approches* made where with the *Besieged* gauled the enemy: shroddly in so much that he was not able (nor withstanding the losse of abundance of men) to get a foot of a ground of them, having chests in the Counter approches which plaied continually with muskettiers, & fires locks vpon the enemy, & casting fire works among the, making up also the ground, & advantageous places before the Enemy could approach vnto them, which did disharted them much, for as soone as *Prince Maurice* of happy memory, came to *Rosendale* with his army to relieue the Town. *Marquis Spinola* seing no hopes of getting it, after the losse of twelve thousand men, was driven to rise without it, and to quit the siege.

## OF ALL SORTS OF BRIDGES, ESPECIALLY, your flagg, or. Bulrush Bridges.

### THE SEVENTH CHAPTER.

UPON an expedition of war, when of necessity an army is must pass River, or a brook, there are commonly carryed boates, or sloopes upon waggons, as hath bee taught before, having Beames, boards, all necessaries laid in the boates and to be vsed, first they take downe the beames, and posts, and then the planckes, and boards, which is done in a trice, when all things lye in order, sometimes they carry onely boates, and sometimes onely planches. To make then a bridge over a River, first these Boates (as many as you shall have use off to laye over the River) are launced into the water, which are bound together with ropes, and fastned with cables and ankors in the bottome over, which sparres, and beames are layd, and then planckes and bords layd orderly upon them, for men to march over. There are likewise such kinde of bridges made with great boates in Fortresses lying upon a River side, when an Enemy is feared, & where one dares not make any other bridge: For, it is drawn up every night like a *draw-bridge*, that if an Enemy had any enterprife upon that place, he might not passe over it.

There are made likewise bridges over the moates of the outworkes of a Fortresse: but an Enemy being approached neere unto the fortresse, having made batteries to beate them down, these bridges are broken down in the outworks, and faillie bridges made, to which they cannot doe much harme, for the making of which one takes some Barrels, or Hoggs-heads bound about with iron, and pitched, unto which rings of iron are made fast for to put post into them, by which meanes these Barrels are joyned together, and lockt one to another, upon which there are laid planks for men to passe over and repasse, & if one would take them up in the night, they do it in such a manner, that they are soone fundred one from an other. An Enemy cannot so easely spoile such a bridge, because it lies even with the wa- and if some part of it should be short a peece, one may presently help it againe, with other Barrels and posts.

There is an other kinde of Bridge, over which one may give an assault, whereof some of them are borne upon waggons, and others upon boates, and are made after the manner of *Draw-bridges*, saving that they are lighter, and drawn upon the waggons, or boates upon which they are laid, but when one is to use them, then they must take them down. Read the *Treasure of the Mechanick Secrets of Augustine de Ramely*: The *Artillery of Diego Vissano*, and the *Theater of the Instruments of Henry Leyssing*, which treat of these things at large.



But of all bridges none are found more necessary and usefull, then those that are made of flaggs and Bulrushes. For all others require great charges, especially, when some Ingenier takes some old invention from an ancient Authour, and gives it out for a new one: for it is reason such a one should be recompenced, because of his invention, and afterward becomes a directour for the making of it, as though no other could be made, but that which he hath invented, and so by this meanes makes his benefit of it, and his count and reckoning according to his desire, by making a bridge, at such a high rate and charge, that makes his masters purse light, and his own heavy. But if you looke narrowly upon it, you shall finde it to be an old invention, as one cast off, and serves for no use. The like doth happen here, for when yee consider well many new invented Bridges, made with great skill and industrie, yet neverthelesse they serve for little or no use. But your bridges made with flaggs, or bulrushes, are nothing so chargeable, and yet neverthelesse of great use; we will shew here in few words, how they are, and in what manner to be made.

The matter whereof they are made is a rush called in Dutch *Biesen*, in French a *lone*, in Latine *Juncus*, and in English a *Bullrush*. This rush groweth in rivers, waters, and brookes some foure, five or six foote high, and is commonly found in brooke-pits, *Marras*, and wet places, especially by Rivers sides, whereof also many times houses are thatcht. The nature of this bulrush is to floate above the water, and are used (being bound up in a bundle) when boyes learne first to swimme, putting them under their arme-pits.

This Bridge above mentionned is made with this rush after this manner following, when they are ripe and growne to their length, then they must be plucked up, and well dried, and when you would make such a Bridge, you must binde up these Bullrushes in round bundles, or foure square, whereof the sides must be some ten inches braod, and about foure or five foote long.

Now having got good store of them, one makes a hurdle of them enterlaced with small withs, five foote broad, and 7 or 8 foote long. Upon this hurdle one layes, and bindes in order the bundles one after another. And afterward one takes two long stakes, a little greater then a pike, which is fastened to the bundle, drawing and binding these bundles fast one to another, which are likewise bound with canvas. At the end of the hurdles one fastens at both ends two or three rings made with withs, to joyn and fasten the *joynctures* of this bridge together.

These kind of Bridges are of excellent use in Seiges, chiefly in places, where one is resolved to take in a worke vpon a suddaine enterprize, and would not be at the charge of making a Gallerie.

When one is resolved to take in such a worke, those which are appointed to force it, being well armed as is requisite, being come to the brinke of the moate by the meanes of the Approches, which are brought thether, they send out before some venterous souldiers, which carrying this bridge launces it into the water, and ioynes the peeces together withall expedition (and while the musketteires giue fire as fast as ever they can) till they haue laid it over the bredth of the moate, and fastened it on the other side, which being done, the Souldiers goes over it, and strues to enter by all means to take in the work, as they are commanded.

But if there be any mine made ready, they stay the putting over of the bridge, and the falling on, till the mine be sprung, for feare of breaking the bridge, and that it might spring backward.

When the Befeiged are resolved to make a Sally, they may likewise make use of these kind of Bridges, all other Commodities and utilities necessity the mother of such like inventions will shew you.

Now for the better understanding of all things touching these buidges aboue discribed, we haue represented them in the figure 159, where you shall see how they are made fast on that side which is to come into the water.

But they are to weake where you are to put over a broad moate, such as are before Townes and Royall Forts, over which one must passe, before they can come to the Wall, for these serve

serue onely for some suddaine peece of service, and therefore it is needefull to make use of some other invention called a Gallerie which are of excellent use though chargeable, & which wee will handle in the next chapter following.

## OF GALLERIES

### THE SEVENTH CHAPTER.

**V**egocius in the 16 chapter of his fourth booke describeth a certaine kinde of worke, which the *Ancients* called *Vinea*, and saith it was a worke made of plancks ioyned together, some eight foot high, 7 foot broad, and sixteene foote long, the roose or top whereof was covered with boards, and hurdles interlaced together, and the sides with Boughes, in such wise that it could not be spoyled with stones, over which also was laid thick *Oxen hydes* newly killed, or coverlids of *Hair-cloath*, to keepe them from fying ( whence it hapneth, that we make use of such coverings in our moderne warres, for to hinder the force and violence of Gun-powder, because they are not so easely spoiled by fire ( as hath bin said about ) and these workes being in a readinesse, one makes use of them to their advantage.

When they havv made good store of them, then they joync and fasten them together, and the *Beseigers* being blinded and covered under them, begin their approches to the walls and sapp under the foundation of them to make them fall.

There is no work which resembles more rightly this invention, of the *Ancients*, then our moderne Galleries. The preparation, the use, the height, the bredth, are almost all alike, and do agree so together in all things, that we must needs confesse that our *Gallerie* is noe new invention, but was in use among the *Ancients*, and which of late yeares hath bin renewed againe.

For if one considers neerely their structure: the *Vinea* of the *Ancients* was made with timber and plancks: and our Galleries for the most part are made with posts and plancks ioyned together. That had also posts to rest upon for its foundation, and this hath also great posts to beare up the weight of the whole worke. The sides of the *Ancients Vinea* was fortified against the force of the *Balists*, because they were laid with hurdles and boughs, wreathed together: but our Galleries are covered with plancks and Earth cast upon them, so that they cannot be spoyled by Canon. The *Vineas* were kept from fying by the helpe of *Oxe-hides* wherewith they were covered, and the sides of our Galleries haue Earth cast about them, that fire-workes may doe them noe harme.

These *Vineas* served to come to the Wall, to sapp it, but our Galleries are brought to the *Basis and Barne of a Rampart*, to make a Myne in a Bulwarke, and so to blow it up.

The height, and bredth of the one, and the other doe not differ much, but it seemes the length is differing, though in effect it differs not much. For the *Vinea* the ioyns of them being fastened one to an other were reasonable long, but our Galleries are sett up with planks and posts, and as it were makes but one peece ioyned together.

Whence it appeareth, that our Gallerie is not wholly a new invention, but hath bene in use of old, though in some things it is altered and changed.

Wee will now take it in hand, and shew after what manner, it must be made with all the appertinances thereunto belonging.

When an *Approch* then is brought so farre, where a Sapp is to beginn not farre from the Town, or Fortresse beseiged, and that one is sapped to the Counterscharfe, then one sees how a Gallerie may be put over the moate. For the effecting whereof, one must make provision of many things necessarie therereunto, and first of all gett good store of longbrush & bundles of boughs, to fill up the moate, with a great number of plancks & posts ioyned & made together like a Gallows, all of them having one height and bredth, which are so framed and made by the *Carpenters* before they are brought down into the Approches, that



one may either take them asunder, or pinn them together without any great labour, for being brought thither, where they are to be used. it is easily done, by marking the ioynts and peeces with one and the same number which they may fit, and ioyne together without any great difficulty.

Such a *Gallowes* hath five peeces, to witt two posts which stand upright one crossewise over them, which ioynes the other two together, and two props and Supporters of timber to bear the crosse post up the two posts are set upright being eight or nine foote long and are cut halfe a foote in the upper end of them for the crosse beame, or post to rest upon the other two posts and to ioyne them together, and a foote and a halfe at the lower end is sharpened and set fast into the Ground, so that it remains seven foote high for the topp of the Gallery, you shall see the forme of it, sett out in the 160 figure following, whereof the length of them from *a b* and *c d* are each of them 9 foote long, and the bredth 6 or 7 ynches: the of half this breadth at the uppermost end of these two posts is cut the length of half a foote, to lay the crosse beame upon them, which ought to be cut in the like manner, having the length of ten foote, or thereabouts, for the longer this crosse post is, the broader will the Gallerie be, and the better for the souldiers to march five or sixe in front, when they are to give an Assault upon the breach, the greatnesse is answerable to the two others, being marked with *A C*. Now for as much as these posts are made in such a manner with joints, that they may soone be joyned together, or severed they cannot be so firme, as those which are joined and pinned fast together by force without being afterwards taken asunder, especially, because of the great weight, which they are to beare; therefore there are props made to support the crosse post, as you may see by *E F* and *G H*, marked in the 160 figure, all which being done, and all peeces joyned and pinned fast together as is fitting, every peece is marked, and holes bored through them to fasten them together in a little time, when there is occasion to have them set up.

*Of the Berds, and Plancks for a Gallerie.*

**A**fter this you must provide in a readinesse good store of *Fir-boards* & plancks, which must be as long as the two posts, or rather 4 or 5 ynches longer, so that if the distance between post and post be 5 foote broad, then these plancks must be five foote, and a half long: for the odd half foote is divided into two equall parts, takeing up three ynches on eyther side of the two posts, into which holes are boared, to naile the planckes and the fast together posts.

The ordinarie space between the posts ioyned together is commonly 4: or 5: (but seldome) 6 foote in bredth, which oftentimes is changed, according to the condition of the place, and as the danger is great or little.

The thicknesse of the planckes is without any certaine measure, because it is needlesse to make them all of one thicknesse, for it may so fall out, that sometimes you must use a thick planck, and some-whiles a thinner, is fitter to stop a hole withall, as Occasion may serue.

Now for the ioyning and fasting of your posts together, you must provide good store of *Oaken-pinner*, and boore all the holes with a *boorer*, to the end the holes may not cleave, now all these pinnes ought to be of one bignesse.

Also in *Galleries* there are used nailes some greater and longer, as you shall haue use for, some of them are 4 or 5 ynches long for to naile the plancks with, which covers the sides: some others 6 or 7 ynches long, which naile the props into the posts, you must haue good store of them of all sises for to use them, when necessity shall require. Your ordinarie *wheelbarrowes* and shovels are here of excellent use, but you must haue *shovels*, that have longer hafts then ordinary to cast the Earth a good way into the moate, which cannot be so well done with short hafts.

In this place one ought to make use of thick planck-blindes, which wee haue mentioned in the Chapter of *Gabions* and blinds, which serue for a very good use in *Galleries*, as we shall show you hereafter.

A Gallerie



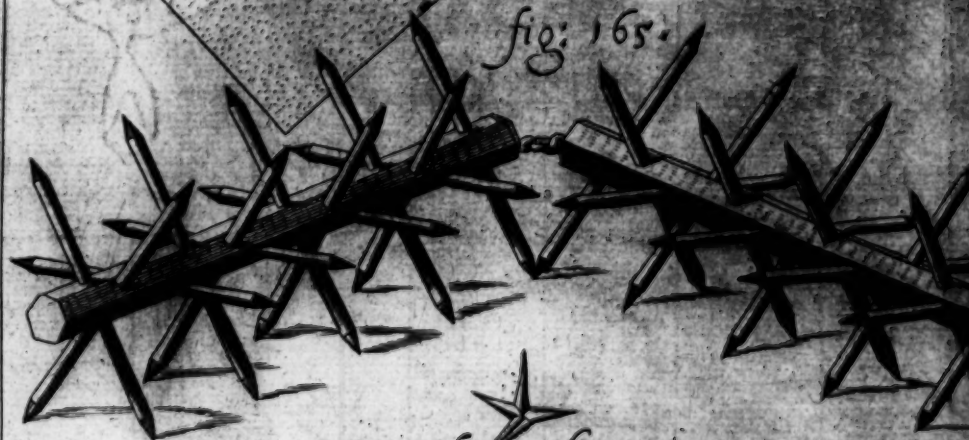
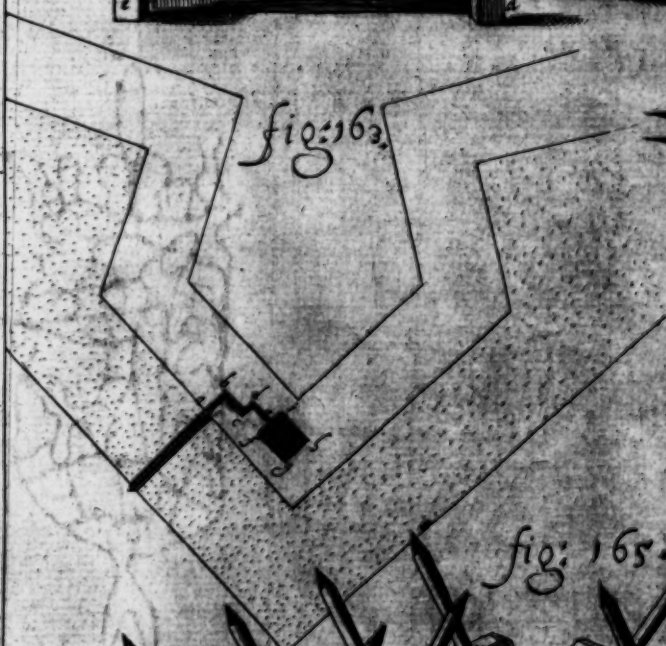
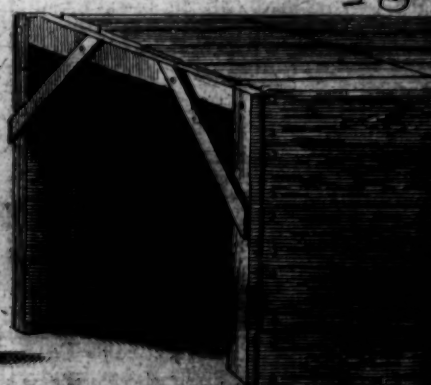


fig. 161.



fig. 164.

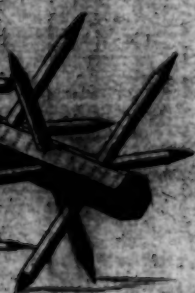


fig. 162.

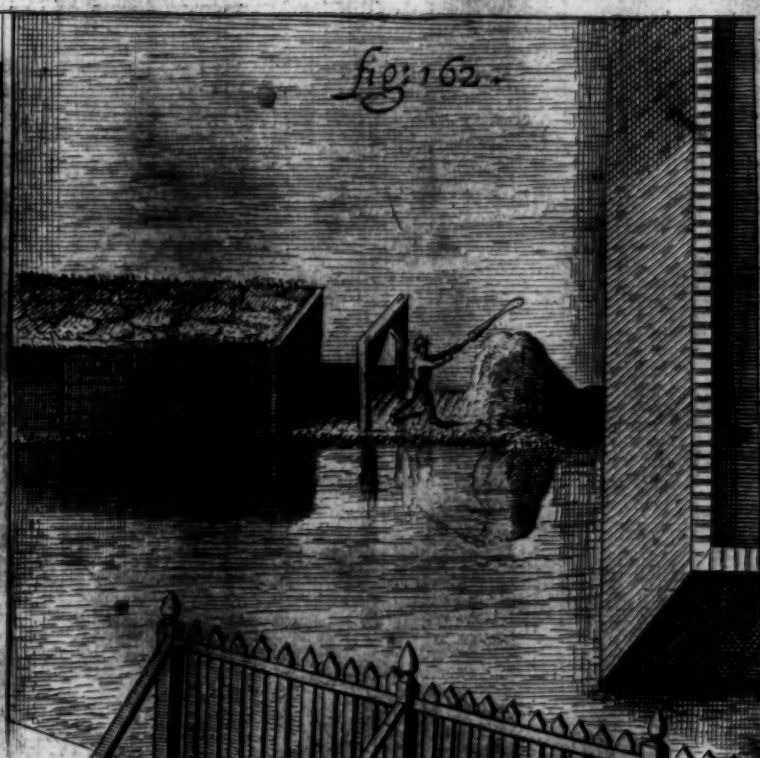


fig. 165.

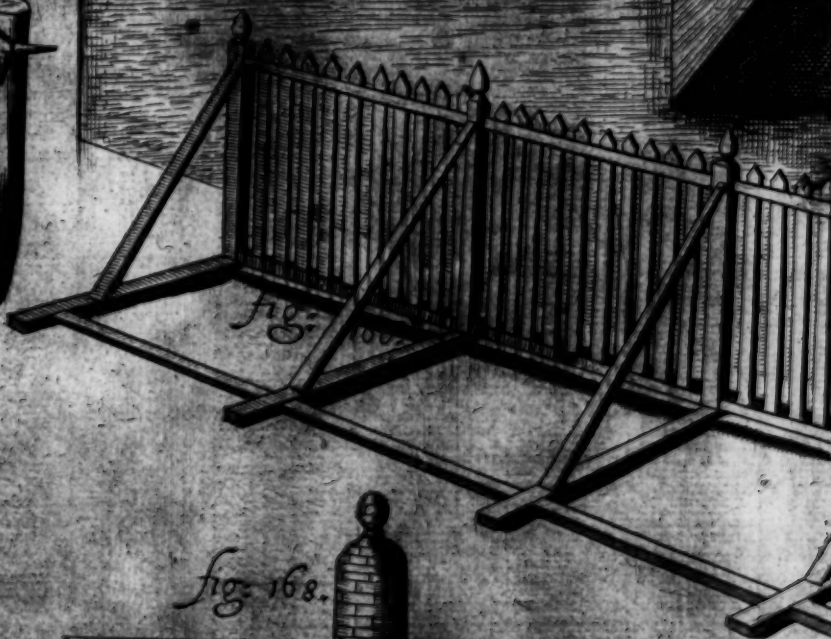


fig. 168.



Kk



*Practised in the Warres of the United Netherlands.*

A Gallerie raised without, being covered with Earth, is represented unto you in the 161 figure.

After you haue sapt through the Counterescarte, and that you are come to the edge or brinke of the moate, and resolute to lay a Gallerie over it, you must first of all provide good store of these bundles of long brush before mentioned, brought downe in waggons, and abundance of Wheele-barrowes, to fetch Earth into the Gallerie, to cast these things into the moat, and to fill it up, even to that place, where you intend to make a *Mine*, and in so doing, you shall by degrees fill up the moate, and make a good foundation for your Gallerie to rest and stand upon.

But because any cannot cast and lay these brush faggots in order, as one would, you shall meete with some venturous souldier or another, who for money will adventure in the night to goe out at the mouth of the Gallerie into the moate, to lay them in order. And to the end they may not be seene by the Enemy, one must obserue well to take the perpendicular of the face of the Bulwarke, which wilbe the shortest way to come unto it.

The moate then being filled with these long bundles, and faggots of Brush abovesaid, so that one may cast Earth upon them brought from the next sapp, the workemen fetches good store of Earth in wheele-barrowes upon plancks laid in the Gallerie, and brings it to the mouth of the Gallerie, casts it upon a heape, and then two or three workemen which are appointed to worke in the mouth of the Gallerie, casts it into the moate to settle the faggots. This Earth cast up in the forme of a heape, serues to cover and make a blinde for the workemen onely before, but not on the sides, and therefore they must be constrained to make blinds on that side which is most dangerous, till the posts be set up, yea oftentimes they must make blinds on both sides of the Gallerie, if an Enemy flanks it from two places. After this one begins to set up one of the posts, ioyned and pinned together as hath been taught, and as you may see in the 160 figure. And lets some men continually to fetch Earth in their wheele-barrowes, others from the top of the heape casts the Earth with their Tong-shovels into the moate, and gets more ground to set up the other post, for having got a matter of five foote, or thereabouts, they sett up the other post ioyned together as is said, after they haue set forward the blinds for to cover the sides of it: which two posts being set up, then they naile the planks fast to both sides of the Gallerie, and they set onely the others upon it without fastning them, by covering the side onely with Earth, which may be beaten downe by the Enemy, till it is able to resist a Canon bullett, and then casts Earth about the Gallerie, about a foote, or a foote and a halfe high, which must be spread, and laid even, to the end fireworkes, may not lie upon it, and spoyle the Gallerie by fying of it.

It happens sometimes, that one side of the Gallerie is out of the Enemies sight, and cannot be beaten downe with their Canon, in such sort, that one needes not cover it with Earth and then that time and charge is saved, unlesse it lies so, that an Enemy can sett fire on it with pitch ropes and other fireworkes, or spoyle it with his Canon, which lies in his *Out-workes*, which being so, then of necessity, you must cover that side, till it is able to resist the Enemies Canon.

And because it would be very darke if the whole Gallerie were covered with Earth, and so very incommodious for the workemen, therefore to helpe that on the safest side, there are little windowes or holes made of a foote high, and a foote and a halfe long, betweene everie three or foure postes ioyned together, to giue light into the Gallerie.

This worke is continually advanced, and the heape raised by the workemen, which cast the Earth into the moate in a greate quantity before them, haueing alwaies a singular care, that the heape from whence they cast their Earth growes not too low, least the workemen be discovered. Afterward they sett up the third posts ioyned together in the same manner as hath been said, and naile fast the boards, and planks to them, this labour must be continued till the Gallerie is advanced even to the very foote and batme of the *Rampard*.

All which is showne in the 162 figure where a Gallerie is made & covered, as also to show that one of the posts ioyned and set up, which must be nailed to the others with plancks, and the heape of earth behinde which the man standes and works, is also here pourtrayed out.

(G)

When

When the Gallerie is brought over almost to the very foote of the Rampart, then one may come to it with more safety, for then the Heape is taken away, and a blinde made of thick Oaken planks to begin a mine into the Bulwarke.

At the lower end of these posts abovesaid, as you may see from B to D, there is an other post besides of the same greatnesse, which cannot be seene; therefore wee haue purposely omitted it, but will remember to speake of it, when we handle the making of the posts and palisadoes.

## THE EIGHTH CHAPTER.

### OF MINES.

AS a Gallery is an ancient invention, so likewise Mines, which we make at this day, have been heretofore in use amongst the Ancients also: and this is the last thing where-with the Besieged are troubled.

A Mine then according to the definition of *Vegecius*, is a Cave by which one makes secret goings under the Earth, to come by night unawares to a Fortresse, or by which one diggeth into the foundation, and bowels of a wall, or of a Bulwark, underpropping the earth with posts of wood, and laying under it dry wood, for when they would make a hole in the wall, they set fire on this wood, which being burnt with the props, the wall fell down, and the Besiegers being in a readinesse attending the fall of the wall, ran presently up by that breach, to assault the Fortresse; which is understood also of our moderne Mines which we make in, by blowing up the powder that is laid in them, whence it appeareth clearly, that this is also an ancient invention, being a little changed, and amended at this day.

This mineing (or digging under the earth) is called in Latine *Cuniculus*, of which name ancient Writers, as *Iulius Caesar*, *Livius*, and *Curtius* make often mention of in the description of this *Stratagem*, it signifieth a Moole from whence the name is taken, because the Mines made under *Ramparts* and *Bulwarks*, resembles the holes and passages, which mooles makes under the earth. There are others which derive this name from the Latine word *Cuneus*, because the Mines are made in the fashion of a *Wedge*, which is thick at the beginning, and diminisheth little by little, even as the Mines which make a rupture in those places where they are made, may be compared to a wedge, which cleaveth a piece of timber in sunder. Mines were of old called *Cuniculary*. He that is desirous to know more thereof, let him read *Vegecius* and *Vitruue*, who have written of Military inventions among the ancients.

We will here describe in a few words, how our *Modern Mines* are made at this day.

The last meanes for the forcing of an Enemy besieged, to make him yeeld, is this making of a Cave or Mine under the earth, which is begun and finished (as is said) after you have brought your Gallery over to the *Barne*, or foot of a *Rampart* or *Bulwark*.

But before it is begun, you must have all things necessary, and in a readinesse, for the effecting of this work, first of all ye must have Spades, Shovels, Pickaxes, and all kinde of *Masons* tooles, with all things requisite to pierce and break the wall, wherewith the Rampart is made.

Afterward, one prepares props to support, and beare up the Mine from falling or sinking, being two, or two inches and a halfe thick, the length of them being not alike, because the entrance into the Mine is made higher then towards the end of it. One is furnished also with firre planks, for to line the Mine within, as above, that it may not sink and fall down, for it must be set with planks on all sides, as well as the foundation, especially if the earth be moulding and wettish.

But before you begin to make your Mine, it will be necessary that you know the condition



tion of the place, that is, whether the Bulwark be hollow and vaulted, or whether the foundation be laid with Branchages, Logs, or borne up with Piles: and whither water may not spoile your Mine, if you should mine too low. In case that the Rampard or the Bulwark into which you intend to mine were laid with logs, or supported upon great Piles, which happens ordinarily in moorish and rotten places, upon which you must build your Bulwarks, and Rampards; or when one can get no other Earth but sand; you must try and get out all these Piles with Cables or ropes, by winding them out with an instrument ordained for this purpose. Now you must pierce and pull out these logs by such wayes and means as is known unto Miners, for the making of a way, and a chamber to lay your Gunpowder in. When you are assured that you cannot digge no deeper; but that shall come to water, then you must raise your Mine a little higher, to the end the powder may lie dry in it.

The Miners then beginning to break into the wall, do carry their Mine so close, and secret as possible may be, that the Besieged may not heare any noise, or gather any notice, where the mine is made, and how it runs: for if they do, without all question, they will make a *Counter-mine* to discover and spoile your Mine begun, so that you shall be driven to begin a new one in another place, as hath hapned many times.

The height, and the bredth of the *Mine* must be made in such a manner, as you may onely lay in the Barrells of powder, for it ought to be no higher, nor no broader, because your intention is, but onely to chamber your powder in it, and therefore it must not be so high as a man, and no higher, but that a man may onely work in that upon his knees, and that he stoops lower, when he goes to lay the powder into its chamber.

The height then must be but 4, or 4 foot and a half high at the most, and the bredth but 3 and a half, or foure foot, according to which measures, the props and the planks are framed, wherewith you are to underprop the Mine.

When you begin to mine into a Rampard or Bulwark, you take out the earth, and carry it away in a vessell, or a pail of leather, which is light, in handing it one to another, till it be brought out of the hole, or entrance into the Mine, and laid in the Gallery, to the end the Enemy may not see it, and gesse whereabouts your Mine is.

The *Master-Miner*, which hath the conducting of the Mine, ought to be a man of great experience, how he ought to carry it, lest he be mistaken, and so make it in a place, where he ought not to make it. Therefore he must have knowledge of a *Compass*, and how the *needle* stands, that he may carry his Mine aright. He ought also to have skill in *Geometry*, to the end he may know of what height he must carry his Mine, according to the proportion of the Rampart.

The nearer he comes unto the place where he is to make his Chamber, the narrower ought the way of the mine to be, in such sort, that it must be no broader or higher at the entrance into the *Chamber*, but that a Barrell of powder may scarcely passe through the way, for the straighter and the narrower the passage is into the chamber, the easier the Mine is stopt.

The place where the Chamber is, ought to be so made, that the powder doth not break neither the one, nor the other side, but that it may blow the earth upward. Nevertheless sometimes the Miners are commanded, to make their Mine so, as it may blow the earth into the Fortresse, or else without which may be done, if they make that side, which is to be blown up, not so thick as the other: for the nature of powder is such, that it maketh the greatest operation alwaies towards the weakest place, and though it blows it up ordinarily: yet commonly it searcheth most often the place, where it may break out soonest into the ayre, which appeareth both in your Canon and Muskets.

The bignesse of the *Chamber* is divers, for it must be made according to the greatnesse and proportion of the wall or Rampard: nevertheless one must observe, that it be made as narrow as possible may be, and yet must have room enough to lay the Barrells of powder into it: the ordinary height is some fixe or seven foot, and the bredth foure or five foot.

When the Chamber is ready, then you lay in your Barrells, the number whereof cannot be so precisely discribed. For one Rampard is greater then an other, in so much, that a greater



ter quantity of powder is requisite more for one place then an other. The common opinion is, that a Barrell of powder will blow up a rod, or twelve foote of Earth. The Barrells are layd in such order, that in the twinckling of an Eye, they take fire all at one time, which causeth a greater operation, then if one Barrell should be blowne up one after an other. After that your powder is chambred, then with all expedition you must stop the entrance into the chamber, with thick and strong planckes, and stop it hard, and rammie it in with good Earth, and leaue a little hole or traine, to lay some powder in it, which traine is carryed to the very end of the mine, and stops up the passage of it with firkins of Earth, that the aire may neither come in or out. For the stronger the Mine is stopt, it will take the greater effect. All things then being in a readinesse, it is left so till one is commanded to give fire to it.

In the 163 figure is represented unto you a myne marked, *A B C D E*, is the way upon the Bulwarke, *E* is the entrance into the chamber, *F G H* and *I* is the chamber it self, wherein the powder is laid.

Here a question might be moved, whether mines ought to be carryed with right lines, or crooked? The answer is, that mines, which are carryed in a right line are sooner made, but because they take not so good effect, the other are to be preferred before them, which are made with oblique lines. For the windings and the turnings of them, adds strength vnto them, that the powder hath not so much force to breake the stopping. Now suppose that it should breake the stopping *D : E*: the rest therefore is not broken, because the force of the powder is kept in by the Earth marked *D*, and driven back to blow upwards, or finding no vent to turne back againe, where it was layd. But in a right line when the powder breakes the stopping, the effect thereof is hundred and diminished, for it is certaine, that the stopping, which is made newly is not so firme as the old settled Earth, which hath lain a long time in it.

OF

## OF COUNTER-MINES

## THE NINTH CHAPTER.

**W**Here there is an *Offensive* Warre, there is also a *Defensive*, as appeareth by mines: for the Besieged having discovered them, which one hath prepared for them, and that there is no hope left, but waiting for the Springing of an Enemies myne in their Rampard, and to giue them an assault, then they are to stand upon their defence, and beginn to make mines also, which they eyther doe to offend an Enemy, or to defend themselves by them. Therefore wee must understand here, three kinds of mines to wit, the workes which are made to finde out an Enemies mine, 2: The Counter-mines, which are made to spoyle an Enemies mine, & 3 the cutting off of a Bulwarke or a Rampard within, of the two foriner, wee will treat in this Chapter.

For the first kind of Countermine, wee understand those workes, and mines, which are made to discover, and find out an Enemies *Mine*, and to kill the miners in it.

After one hath found it out, as also for the casting down of the same work, and the taking away of the powder chambred, the Enemy will finde himself deceived, when he thinks to spring his Mine, attending the operation thereof in vaine, because the powder is stolne out of it.

For to finde out an Enemies mine, there are two manner of wayes, the one which was used by the *Ancients*, and the other practised at this day.

*Vitruvius* in the said Chapter of his tenth book, describeth the maner of the *Ancients*, and saith that the Cite of *Apolonia*, being besieged, and the Besiegers having made some Mines under the earth to assault the Citizens, on a sudden within the walls; the Citizens being advertised thereof, were extreemly affrighted thereat, and began to faint and lose their courage: because they knew no remedy to prevent it, and could by no means finde out the place where the Mines were made. But *Trypho Alexandrin*, which lived in that age, the *Architector* of this City, caused to be made along under the walls a great many ditches, and withall some Mines under the walls continuing them beyond the Enemies, as farre as one could throw a stone. He caused to be hang in these ditches vessels of Copper, under those places, where the Enemy wrought, which made a noise, by reason of the moving of the earth, whereupon he found out the Enemies Mines, and filled Cauldrons of brasse full of boyling water, and melted pitch, to powre it down through holes upon the heads of his Enemies mines. He cast down also mens dung, which was mixed with hot sand and gravell, which he did by night into the Enemies Mines, into which he had made divers holes, and by this meanes slew a great many of them.

*Herodotus* in his *Melpomina* makes mention of a *Tinker* which dwelt in the City of *Barca*, besieged by the *Persians*, who discovered the Enemies Mines by the meanes of a Buckler of Brasse, which he hung in divers places against the wall, and so found out at last the place under which the Enemy mined.

But at this day to finde out an Enemies Mine, they use to make counter-ditches, as hath been said, and before a Mine is begun, it is necessary to be informed, after the manner of the *Ancients* of the place, which may be undermined by an Enemy. But Mines are searched out after divers other wayes.

Some are of the opinion, that round about the walls, and Bulwarks of a Town or a Fortresse, (to wit, when the fortification is first begun) one should make hidden caves and passages under the earth, by which one might discover, and finde out an Enemies mine. But this me thinks is not good, because the walls and Bulwarks are made thereby prove weake, and these caves being made with posts, and planks, which in tract of time are subject to rot, and then the Mines afterward falling down, all that labour is lost. Also it is dangerous to make vaults in Rampards, and Bulwarks, seeing it is to be feared, that such a work is not durable, sith it must bear up to great and ponderous a weight, besides it will cost excessive expences. And though these Countermine should be thus made and ordained: yet it is not cer-



raine, but that an Enemy in myning may meet iust with one of these Mines, and so take his way and advantage, either over or under it, and so leave this Counter-mine alone.

A second opinion is, that some findes it good, that one should hang trees, and other bushes in them, which are found often in the Rampards of the *Cimbri*, which being stirred with the least motion, gives a sound, whereby one may finde out the place where the mine is. But this is a thing uncertain, because the least gale of wind, will easily shake these bushes, and branches of trees. And if they do, it must be done in a still and a calme weather, when there is no winde stirring. And therefore I answer, one ought to search out an Enemies mine at all times, for it were an absurd thing, for one to stay from finding an Enemies mine, till a calme time comes, who will advance (as much as possible may be) his work, without staying for still or faire weather. Therefore this way serves but for little use.

A third and a better way, and which is the ordinary way, is to let a drum in the place suspected, with some Dice, pease, or beanes vpon the head of it, which upon any stirring, will leap upon the drum, when it stands over the place where one works. Nevertheless you must not let it stand in one place onely, but remove it now and then from one place to another, yea so often, that you are assured of the place, which is shaken by the work which is made under it. Some make use of a Balon of litany filled with water, and imagines, that the mine is there, where the water moveth, but that is uncertaine as that of the *Cimbri* is, spoken of before, but that of a drum is held to be the best and surest way. Notwithstanding, one may make good use of Balons, when they are set upon a *Rampard*, as a drum with peas or other things. For by such a meanes one may know the place, which is undermined. The use of Balons without all question, took its Originall from the Invention of a Kettle, whereof wee haue spoken even now.

A fourth opinion besides these which is in use also; is a great long iron Borer, to bore into the Earth, wherewith those which searcheth the Earth, bores a hole with it into the *Rampard*, & laying his care to the hole to liste well if he can heare any noize, which is practised in suspected places. Many other Inventions are invented by necessity the mother of practise.

To resist then the mines of an Enemy, one makes use of this practise following. After you haue curiously searched out the Enemies mines, and that you are assured of the place under which they are hid then you may find them out without all question, and nothing remaines then, but to make a *Counter-mine* against them, which is made in the same manner as we haue described in the former chapt. treating of mines, to wit, by underpropping the Earth with posts and laying planks betweene them, that the Earth may not tumble down. Now because one is not assured to meet iust with the Enemies myne, which may be made either too high, or too low, therefore you must make many, till by one of them you haue found it out, and are come to the *Chamber* to take away the powder.

When an Enemies myne is carryed so secret, and hidden, that one cannot finde it out, then the besieged must of necessity resolute to quit that part of the *Rampard* or Bulwarke under which they suspect there is a mine, and to cut it off inwardly. But for their advantage they make ready also their *Countermine* made in that place, & chambers their powder attending the effect of the Enemies mine, and when he springs his mine, then they retire themselves into their new worke cut off, and the Enemy being lodged in that peece of the Bulwarke or Rampart, which they haue quitted, then they blow up their *Countermine* and slay all those, which they find in it.

The like also is done in outworkes and Counterskarfes, when one is driven to quitt them, and that one cannot keepe them any longer.

OF

OF PALISADOES: PALES: TURNE-PIKES:  
BARRICADOES, QUADRANT-TAN-  
TERNAILES: AND BEARES.

THE TENTH CHAPTER.

**W**Ee haue often made mention of *Palisadoes* and the use of them, especially when they are struck into the ground about dry moates, for then they serue, in stead of water against the sudden assault of an Enemy, so that not onely the moates before great walls, and Rampards, ought to be set with them, but also all Outworkes must be fortified with them.

They are likewise of excellent use in the Field, when trenches are set round with them, and struck in round about Forts, and workes, which lie in the most dangerous places.

They are of no lesse use also in Fortresses, especially when the Besieged are constrained to make cuttings off within a towne, or Fort: moreover they are good to be struck in upon the topp of Breaches, whereof we will treat in the next chapter.

These *Palisadoes* then are made in this manner following, one makes choise of good and strong *Sparrs* being some 3 or 4 ynches in *Diameter*, but of severall lengths, according to the place into which they are to be struck, whereof some of them may be 5, 6, or 7 foote long. Now the lower end of them must be sharpened and pointed, and the upper end flatt, that they may be driven into the ground with a mallet or a beetle: one bores also a hole some 3 or 4 ynches under the head of the *Palisadoe*, and another some three ynches under the first hole, and a third hole on the side through the middest of the two others, in such sort, that the nailes, which are driven through it, resemble as it were the corners. In some also they use to drive in two nailes, so that they are not struck in a right *Angle*, but rises a little towards the head of the *Palisadoe*. The length of these nailes, must be some eight or twelue ynches, and so bigg, that they cannot be easily bowed or broken, and the *Head* which is driven into the *Palisadoe* is some-what greater, then that which sticks out, which ought to be very sharpe.

When you are to use these *Sparrs*, whereof you must haue good store, you take first of the shortest size, being but five foot long, and strick in a long ranke of them, as you shall finde necessarie. They are driven into the ground the depth of a foot and a half, or sometimes more, according as the Earth is conditioned, and thus you shall make your first ranke: then you shall drive in an other ranke of *Palisadoes*, being six foote long, which are set behind the first ranke, to the end they may run in a right line with the first, but must be struck in a little sidelings, to the end, that their nailes may fill all places necessarie, and the heads of these *Palisadoes*, ought to stand about halfe a foote higher, then the others: In the same manner you drive in the third ranke, which must be half a foot higher then the second, and thus you may doe, if you will drive in a fourth ranke, yea as many as it pleases you. These *Palisadoes* are represented unto you in the 164 figure.

For the *Palisadoes*, which are used against assaults, there are two sorts of them. The first is that sort of *Palisadoes* which are sett upon the *Parapets* of Forts, *Outworks*, and *Redoubts*, for to hinder an Enemy that they may not so soone assault or scale a place: these ought to be 3 or 4 ynches in *Diameter*, and some 6 or 7 foote long, whereof the half past is driven into the *Parapett*, and the other half stands upright.

For the other sort, those great headed piles or pales, clasped together with chaines, and plates of yron, which stand alwaies upon *Rampards* and *Bulwarkes* covered with a little roof, against the time of necessity, when as an Enemy seeks to assault a Fortresse. For by this meanes he is repulsed, when he would scale a Rampard, because these *Palisadoes*, or logs



being cast downe a wall, annoyes greatly the Beseigers, in regard of their weight, which they are not able to resist, though they be armed with head peeces.

## OF PALISADOES, PALES, VRIZ-RUY- TERS, CAVALLIERS DE FRIZE,

*Called in English Turne-piks*

### THE TENTH CHAPTER.

**W**He have observed in our declaration of Originall names whence, the *Cavalleries De Frize* tooke their name: to wit, at the siege of *Groeninghen in Frizeland*, where they served for great use, by stopping and hindring the Enemies horse, when they came to relieue the Town, and then got this name of *Vrize ruyters* in Dutch, *Cavalliers de Frize* in French, and *Frize Horses or Turne-pikes* in English, and besides the stopping of a suddaine charge of Horse; they are of excellent use, to be clapt on the topp of a breach, or some weake place of a Trench, or a wall, and good store of them ought to be carryed along with an Army on waggons, to be sett up in some *Avenues*. or passages, to stop and hinder the sudden attempt of an Enemy, when one hath no time to cast up a trench.

In Fortresses they are also of greater use then chaines or Barres, which crosse the streets. For a man may skip over a chaine, and a good Horse will leap over it: But being beset and crossed with *Turne-pikes*, neither Foot nor Horse are able to passe over them, seeing they have staves and sharp points through them on all sides. They may be set up also in the streets of *Suburbs* and other places in stead of Barres, and where some broad places are to be kept, in joyning many of them together, which is done ordinarily in the expeditions of Warres.

They are made in this manner following, you take a tree of firme wood, which will not cleave, whereof the *Diameter* is five or sixe inches, and some 10, or 14 foot long, which is made with six corners, so that it hath six sides, and in the midst of these sides, one bores three or foure inches one from another cros-wise, and then puts through these holes round Javelings, whereof the *Diameter* is an inch and a half, or at the most two inches, the length of them is sixe or seve foot, and so made, that they are all of one length, which are made of a strong and a firme piece of timber, which will not easily bend, nor will be weakned by raine, these are thrust through these holes, so that they are of a just length on both sides, and have as many Javelings on the one side, as on the other: so that the *Turnepike* is alike over all, and falleth alwaies after one fashion, as it lies, and as one would have it. Both the ends of these Javelings are headed, and sharp pointed with yron, and the ends of the tree are plated about with rings of iron, that the tree of the *Turnepike* may not cleave, and in the middest of both ends there are rings and clasps made to tye two or three of these *Turnepikes* together with chaines, if occasion should seive, all which is represented in the 165 figure.

Where there are some *Banks* near unto a Fortresse or water, where Shipping may passe to and again, or where a water may be waded through, there are made pales or *Barricadoes*, represented in the 166 figure, which are made with Sparres of strong wood, squared out, being some 4 or 5 inches big, and some nine or ten foot long, which are set between 2 great posts, about 5 or 6 inches one from another, as ye may see in the 166 figure.

The fouresquare *Tanternails* is a very necessary thing for defence, having alwaies one of the points standing upward. For they have foure points as sharp as a naile, whereof three stands upon the ground, and the fourth howsoever it lies, standing bolt upright. They are of divers greatnesse, for those which are commonly used in this Country, are lesser then those

those which are cast into a Moate. The point whereof is 3 or 4, or 5 inches long. A Fort-ress ought to have good store of them for to cast them into a moat, into a fallie bray, or upon a Breach, because they do prick and hurt shroddly the Souldiers feet which strives to enter. They are represented to you in the 167 figure.

Your *Dodanes* or *Beares* made of stone or brick are set upon a banke by a river side, to keep the water from overflowing, (or turning out of a moat. The Dutches calls it a *Beare*, because it represents the shape of a *Beare*, but the French terme it *des d'Asnes*, and of one word corrupted *Dodanes*, that is, *An Affes back*, because it hath some resemblance of an Affes back, upon which disobedient Souldiers, who committed some notable offence must ride upon some houres one after another, which we call in English a *Woodden horse*, and hath the fashion of an Affes back.

*Maistor Simon Stephens*, Prince *Maurice* his old *Mathematician*, in his new book of Fortification and Sluces, makes mention of some great faults committed in the making of these *Beares*; because the foundation which should sustaine and beare up this ponderous Worke, ought to be exceeding strong, and soundly laid; for otherwise the expence, and the labour which it costs will be cast away and in vaine. For the preventing whereof, he giveth good counsell to sink into the bottome of the moate, piles of *Mast trees* bound fast together, add of one, and the same bignesse and length, which will make a strong and a firme foundation, whereupon after ward you may build your *Beare*.

It must be made a good deal higher, then the water, when the tides, or the rivers are swolne up to the very bankes; and it must be made so thick, that it may be able to resist the force and violence of the water, and the stones and brikes so laid and plaistred together, that the water cannot eate or soake through it. And because these *Beares* in moates might serve as a way to straddle over and get into the Towne or Fortresse by, at both ends there is two *palissadoes* set the one upon the banks, and the other one higher side next the *Moor*, as you may see in the 166 figure, before which also is stuck into the ground, many other small *palissadoes* of 4 or 5 foote length before mentioned. But the topp of the *Beare* is made with a sharpe Edge, and in the middle of it a little round turret, to hinder, and keepe back those that would clime over it: Some times there are made two round turrets when it is made over broad water or moate, the figure 168 will shew you the contrivance of such a *Beare*.

And if the water be so high, that it will overflow the *Beare*, then it must be made so high, that it may be able to resist the force and violence of the water, and the stones and brikes so laid and plaistred together, that the water cannot eate or soake through it.

And if the water be so high, that it will overflow the *Beare*, then it must be made so high, that it may be able to resist the force and violence of the water, and the stones and brikes so laid and plaistred together, that the water cannot eate or soake through it.

And if the water be so high, that it will overflow the *Beare*, then it must be made so high, that it may be able to resist the force and violence of the water, and the stones and brikes so laid and plaistred together, that the water cannot eate or soake through it.

And if the water be so high, that it will overflow the *Beare*, then it must be made so high, that it may be able to resist the force and violence of the water, and the stones and brikes so laid and plaistred together, that the water cannot eate or soake through it.

And if the water be so high, that it will overflow the *Beare*, then it must be made so high, that it may be able to resist the force and violence of the water, and the stones and brikes so laid and plaistred together, that the water cannot eate or soake through it.

And if the water be so high, that it will overflow the *Beare*, then it must be made so high, that it may be able to resist the force and violence of the water, and the stones and brikes so laid and plaistred together, that the water cannot eate or soake through it.

And if the water be so high, that it will overflow the *Beare*, then it must be made so high, that it may be able to resist the force and violence of the water, and the stones and brikes so laid and plaistred together, that the water cannot eate or soake through it.



# OF RETRENCHINGS, OR INWARD CUTTINGS OFF, AND HOW ONE MUST RESIST

AN ASSAULT. THE ELEVENTH CHAPTER, *Interieur*

**T**HE Art of Fortification is not onely of perfect Fortresses, provided with all kind of outward workes, but also hath besides an other use, being that it teacheth also how one ought to prepare and furnish a Towne or Fortresse with new workes, When the others are ruined. This part of Fortification is called in French *Retranchement Interieur*, in Latine *Recessus*, and in English *Inward Cutting off*: because such workes are made to no other end, but to make a Retreat into, when the others are lost. For, when one cannot maintain, and defend a whole worke, or a part thereof, because an enemy striveth with all his power to become master of it, one must then resolve, when he is driven out of one worke, how he may retire into another, and defend himself againe, against the assault of an Enemy, because it would be very hurtfull to defend one self, when he lies open to an Enemy.

This *Inward Cutting off* is of two sorts, the one in outward workes, the other in a Fortresse it selfe. Besides, it is in Generall, or particular. Wee will first handle the Cuttings off which are made in outward workes, which are the first, vvhich an Enemy seekes to take in, and afterwards the Cuttings off, which must be made in a Towne, or Fortresse it selfe.

Touching a *Generall Cutting off*, it is onely used in *Crowne-workes*, *Horne-workes*, or *Tenailles*. The same is also of two sorts *Regular*, and *Irregular*. A Generall cutting off is, vvhhen a worke is made in all things like unto that, vvhich is cut off, in such sort, that a *Crowne-work* is made vvvithin a *Crowne-work*, a *Horne-work* vvvithin, a *Horne-work*, and a *Tenaille* vvvithin a *Tenaille*.

*Irregular* cuttings off of outward workes is that vvhich is that vvhich keeps not the forme of the worke, vvhich is cutt off vvvithin, yet neverthelesse shutteth up the worke vvvith a continued Parapet.

A particular cutting off is vvhhen a worke is made out of broken workes, or severed one from an other, in such vvhise that there is made one, two, or three *Ravelings*, in stead of a *Horne-work*, or two *demy-Bulwarkes*.

You must observe vvvell, touching every kinde of cutting off here set downe, that they may have a good defence, and if it be possible, that they may also be defended from some other places, and that they lie open to that side vvhich lookes into the Towne or Fortresse besieged.

A *Generall Cutting off* in *Crowne-work* is done as followeth, one falls backward some 20 or 24 foote, yea more or lesse, according as the condition of the place is, and as necessary require, and one makes a worke within it, like unto the other which is cut off. And though his worke being cut off, is lesser then the other, yet it will give an Enemy enough to doe when he shall attempt the taking of it in. Your *Crowne-workes* are made commonly after the proportion of a small *Fort Royall*, where the proportion of the *Polygons* are of 55, 50 or 45 rodd: When you resolve to cut off a worke a little more inward, it will become narrower, in a regard of the great worke, yet will be great enough to defend it self.

The *Generall Cuttings off* of *Crowne-work*, will cost no great labour, which may easily bee shewne, in regard it is very common. An example thereof you may see in the 169 figure: The cutting off being made, one is forced to make a ditch, between the worke quit-

ted,

Fig. 169.

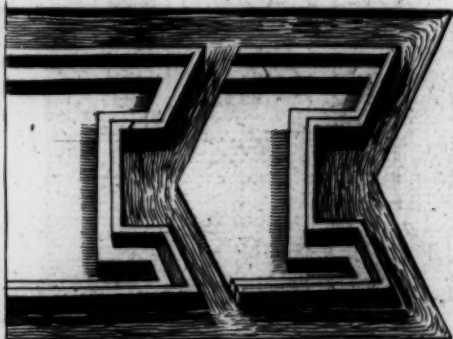


Fig. 170.

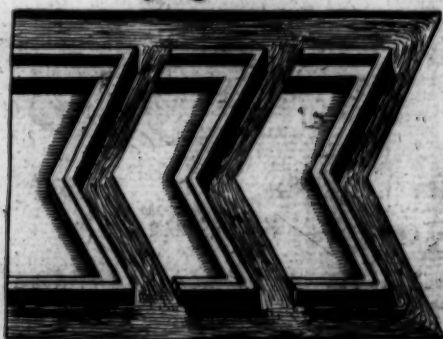


Fig. 173.

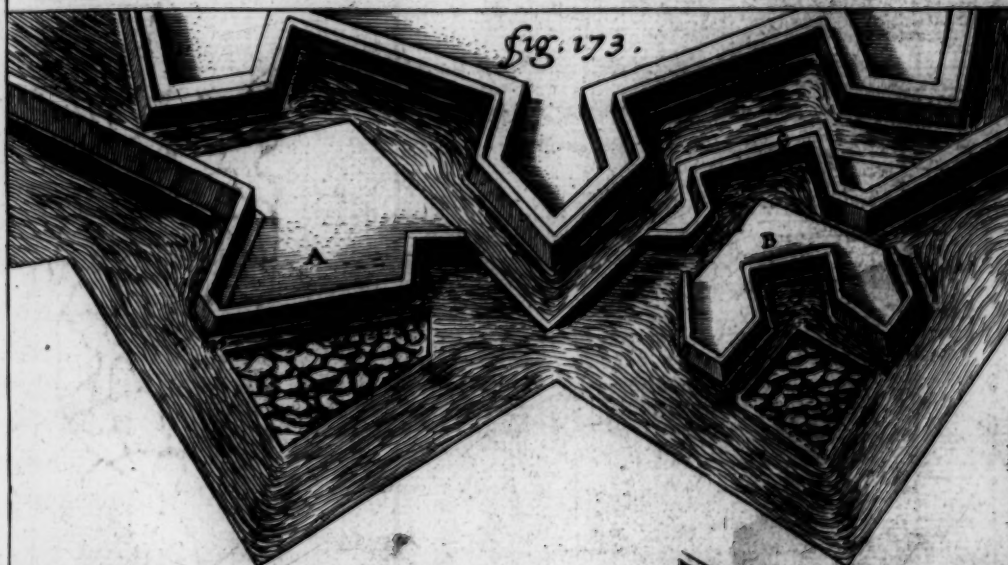


Fig. 176.



Fig. 177.





fig: 171.



fig. 172.



fig. 174.



fig. 175.

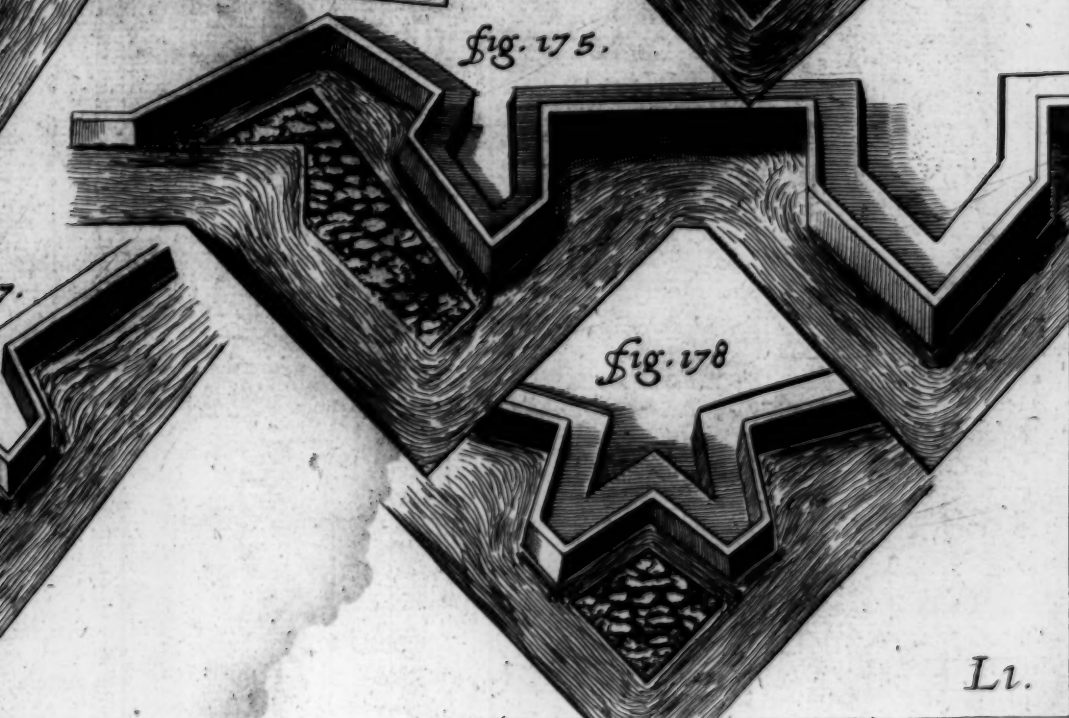


fig. 178

ted, and the cutting off, which ought nevertheless to be done, because one takes the Earth out of the ditch, to make up the cutting off withall: one must observe also, that this cutting off must be made, as strong as possible may be. The cuttings off are not made only, while an Enemy is approaching towards you, but also when Towns and Forts are first fortified.

Your Generall cuttings off in *Tenailles* doth not differ from that which is made in *Horn-works*, saving that one make a *Tenaille*, in stead of a *Horne-works*.

The particular cuttings off of *Horn-works* is after so many waies, that one cannot shew here all the kinds of them. A Cutting off is represented unto you in the 171 figure, where a *Horn-works* is cut off, and two *Ravelins* made in the sides of it, which are defended by a third, which is behinde the others: and though they have a sufficient defence of themselves, yet the defence of the other *Ravelin* is added to them over and above, and is defended from the *Tenaille*, which is after it.

Besides this, there is an other kinde of cutting off a *Horn-works* shewne in the 172 figure. Imitating these cuttings off one may make many others, as necessity may permit, and as an Enemy attempts upon you, all which is impossible to marke out here.

A Generall Cutting off of a great Wall or Rampard is used very seldome, because the Besiegers, and the Besieged will at last grow weary thereof. Nevertheless, this hapned in the siege of *Ostend*, which lasted three yeares, three months and odd dayes: for assoone as the Enemy had got into the wall by sapping and springing of mines, they presently had an other Cutting off ready to entertaine them: in so much that during this siege, there were many *Counterapproches* against approaches, *Countermines* against the Enemies mines, so that the Enemy could not get for a long time scarcely an inch of ground upon our men, for there were above forty mines sprung on both sides, and when the Earth fell our men fought for that and turned up the earth against them, for these Generall and Royall cuttings off lasted till the enemy had got more then halfe the Towne, before they came over the whole. And though such a *seige*, and such a great cuttings off happens but seldome, yet you shall see an example thereof in the figure 173, where is shewn how one ought to quit a whole part, of a Towne, or Fortresse, with the Curtaine and Bulwarks, and how one by a cutting off a Bulwark, or a Curtaine is more usual, whereof wee saw an example at the siege of the *Bosch* in the *Vulcher* Bulwark, as also the last yeare at the siege of *Brill*, where both the *Gunnels* and *Hagfish* *Horn-works*, with both these Bulwarks were most dangerously cut off. Now to represent unto you some cuttings off, which you may see in the 173 figure, marked with A, B, and C. The letter C shewes you how one ought to quit a whole Bulwark, and how you ought to make your Capitall line after a Bulwark is cut off.

Likewise other kinds of cuttings off of Bulwarks are represented unto you in the figure 174, 175, 176, 177, and 178, after which manner, you may make many others, and change, and order them, as an Enemy comes neere you, and as the commodiousnesse of the place shall require.

It happens also sometimes, that Curtaines are cut off inwardly, when as an Enemy may assault them with advantage, because of their length. You may then cut them off as is shewn in 173 figure, when you have time enough to cut them off royally. But if time will not permit you to make a royal fortification, then you must make use of *Transes*.

It is impossible to cut off a *Falzebray*, because of the little space, which is in it. Notwithstanding one may cast up some *Transes* in it, especiall on that side, which the Enemy seeks to take in, and towards which part he would advance his gallery, to the end, you may not give too much to an Enemy, but keep and maintaine the place, as much as possible may be. For the Besieged may lay hold on the same advantage, as their Enemy doth, when he is once got into the *Falzebray*, and though when he is in that, they may cover the roofof it with planks, one may nevertheless, let fire on it, and disaccommodate the Enemy on all sides.

As for other workes as *Ravelins*, and *Halfmoones*, you may see how they are cut off after the same manner, as the Bulwarks are, if the worke which is to be cut off be great enough, and have place enough in it to be cut off.

But for as much as all this here shewne, concerneth principally the defence, which ought



to be considered in all ordinary Fortresses, so one must have a special care to the *materia*: whereof these works are made: for in making of them, you must choose the best Earth that is to be got, which will make your works the stronger.

In outworks you may alwayes rake in the Earth, which is digged out of the moate. But because that sandy earth, or Earth mingled with sand, is not so good, it is lined with rife, or Brush, which is layd betwixt and upon it.

In great *Bulwarks*, where there is not Earth enough and besides that is sandy it must bee layd with rowes of Brush, driven them in with stakes and spaces of houses shot down with canon. But when the ground is so sandy, that you cannot worke it alone, then you must lay dung, and straw, and other things berwixt it to make it hold together, and you must wet the Earth, as many times as is needfull. You may fortifie your *parapets* with *gabions*, when you cannot make them otherwise, and likewise you may sett great *muskets baskets* upon the top of the *parapet*, that it may be covered the better.

In *outworks* one may make use of the ordinarie *prossile* when you have time enough to make cuttings off, or you may make them long before hand. But the works which are made in great hast, have no certaine rule: howsoever, you must make them as strong as possible may be, and as meanes, and time will give you leave.

Touching the cuttings off of *Bulwarks* and *Curtains* one can give likewise no certain rule. Onely this you must ever have a care, that all inward works, & cuttings off lie open towards the Towne or Fortresse, with this *proviso* also, that they be not made so high, but that the great works may over look and command them. For, if the *Rampart* of the cutting off be lower then the high *rampart* of the Towne, then the Enemies canon can do it no great harme, because they are defended from the great *rampart*. Again, the Enemy cannot discover the place and the forme of the cutting off, according to which one may governe themselves otherwise. It is certaine also, that one cannot beate an Enemy from a high place, which is neere at hand, because he is blinded and covered with the wall or *rampart*.

All these things being finished, when one is assured, that an Enemy is ready to spring his *Mine*, which cannot be found out, one must then strengthen, and double the guards in every place, and bring your canon to those places, where they may most gale and flank the Enemy. One ought to have an eye, as well on other places, as onely upon the *Breach*, which is made by the springing of the mine. For an Enemy hoping that he may have drawn the most of the forces in a Town or Fortresse to defend the *Breach*, may attempt some other place of the Fortresse, which is not thought upon, and so become master of such a place, which is not provided with a sufficient defence.

After that the *Breach* is made, the *Besieged* must expect to be presently assaulted, which they must maintaine, and make good as long as possibly, they can by defending the breach courageously, in doing whereof, they must throw downe from the top of it, abundance of these *square tannails* spoken of in the chapter before, for to annoy and prick the Enemy, when he seekes to mount up and to enter it.

Vpon the top of the *Breach* also, if they have time they may cast up a breastworke, as Sir Francis Vere did in Ostend, or set up some turn-pikes, to hinder the enemy for entring, and to strike in some *pallisades* upon the top of it, having *clubbs*, *staples*, stones and ashes to offend them.

It is necessary, when the Enemy strives to enter it, that the souldiers fight courageously, & that the officers should encourage them with their presence to carry themselves like brave men, that being a place to gaine honour in, by giving them also promises of reward, and when they grow weary, to see that they be seconded with fresh men, which stand in a readiness behinde the *Rampart*, to relieve them.

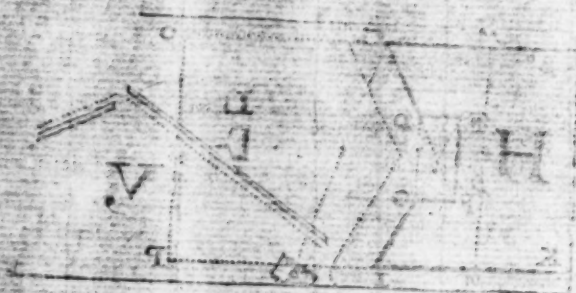
When they are not able to maintaine and defend the breach any longer, then they must retire into the *cutting off*, and take a new courage, and a hurt of grace in fighting behinde a new *Rampart*, in making resistance as long as ever they are able.

A BRIEF





AND  
Disolved and solved by that famous Mathematician Master  
JOHN STAMPION of the High School



## THE MATHEMATICALL DESSOLVTION VPON THIS

Antwerpian question, Dedicated to all the lovers of that noble Science, by Master

*John Stampion de Jonge Mathematician.*

Sirs The wing of Fame hath of late fluttered out; That new curiengenuity is brought to the tryall of the Touchstone by proposing of a certain question under the name of Senor *John Baptista* of Antwerp, whole pate is twolne with selfe conceitednesse and pride, which being not worthy the answering I will come to the Solution of it, rather to give satisfaction to our Batavians, then to fulfill the desire of the Propounder. And this may serue as an introduction unto it; to the end that the honor, which he doth assume unto himselfe, may not wholly be appropriated unto himselfe.

### The Dessolution.

Let this figure above of a Hornework (as he saith) be decyfered by H. whose bredth MN is known to be 34 Rods 7 foot and 7 inches; & the required batterie now d A, whose place is likewise found out by the known conditions. The first condition is, that the violence of the Canon planted upon the batterie A beates with as much force upon the flank ED, as it doth upon the face CD. whence it is manifest, that the angle of the espaul, or shoulder EDC, being devided into two equal parts with the right line TVD A that then this batterie of necessity must come to be in the right line TDA. Secondly that the face DC, & JG, and the distance DG, may with the like Canon shot be flanked and beaten upon from the batterie A, that is, when as the Angles IAG, GAD, DAC, are alike one to the other, whence will follow, that through the five points CDGI and A a circular circumference will passe. Now for that which concerns the third known part, namely, as that the batterie A must be no further from C then sixty rodd, or sixe hundred foote, as being the greatest distance in the circumference as the third booke and 15 proposition, which is taken from of the middle-line of Euclids propositions. we haue found out according





